

**Exploring Undergraduate Perceptions of
Meaning Making and Social Media in their Learning**

by

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A thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

in

Adult, Community and Higher Education

Department of Educational Policy Studies

University of Alberta

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Abstract

Those concerned with teaching and learning in higher education and the Net generation's perspectives on and uses of technology must address calls to move beyond the digital native debate (Bennett & Maton, 2010; Kennedy, Judd, Dalgarno, & Waycott, 2010) by asking students directly what they see as a meaningful part of their learning. This study aims to move beyond the digital native debate by developing research-informed understandings of the ways in which Net generation students may perceive technologies, specifically social media, to be a meaningful part of their undergraduate learning. The research questions guiding this study include: *(RQ1)* In what ways do undergraduate learners from different disciplines view social media to be a meaningful part of their university learning? *(RQ2)* What characteristics of social media do undergraduate learners see as contributing to their meaning making during their university learning?

This study uses a social constructivist approach, thereby employing two main premises: learners actively construct their own knowledge, and social interactions are an important part of knowledge construction (Woolfolk, Winne, Perry, & Shapka, 2010, pp. 343-344). The research design is a mixed methods research (MMR) methodology, a methodological approach where a combination of methods is intentionally used to best address the research questions (Creswell, 2008; Creswell, 2015). This study's MMR design involved a first phase qualitative component of intensive, semi-structured interviews with 30 undergraduate students enrolled in full-time studies at the University of Alberta, a large, Canadian, research-intensive university – with ten students from each of the three disciplinary areas of 1) humanities and social sciences, 2) health sciences, and 3) natural sciences and engineering, analyzed using a generic qualitative approach (Merriam, 2009) incorporating constructivist grounded theory techniques (Charmaz, 2014). The second phase quantitative component was comprised of undergraduate students across disciplines with

survey responses ($N = 679$) regarding their perspectives on and uses of social media technology in their university learning. This phase included two pilot surveys conducted before the final survey was distributed to ensure the reliability and validity of the instrument developed. Survey responses were collected electronically via SurveyMonkey, and analyzed via descriptive statistics.

The findings in this study shed new insights into student perspectives and uses of social media, and the variety of ways in which undergraduates intentionally chose (or, chose not) to incorporate social media into their university learning in meaningful ways. The interviews provide a detailed picture of undergraduate perspectives regarding the specific ways in which social media can help and hinder learning, comprising what students consider as a double-edged sword. Student perspectives and descriptions formed key recurring themes, which emerged into several core characteristics of social media, as well as core categories of meaning making in undergraduate university learning. Within the qualitative interviews and the open-ended survey results, there is an overarching theme of social media as a double-edged sword that both informs and distracts, having the potential to both help and hinder learning. Together, the qualitative and quantitative results demonstrate that several contextual relationships exist, including an important relationship between the particular ways of meaning making identified and the specific social media technologies undergraduates use for their university learning. For those concerned with social media in higher education, these results show how factors such as age and digital native claims should not be seen as primary, deterministic elements of technology use. Rather than taking an approach founded upon technological determinism, the idea of a generational zeitgeist should be considered, where learning context and social media affordances become key.

Preface

This thesis is an original work by Erika E. Smith. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, Project Name “Exploring Undergraduate Students’ Perceptions of Meaning Making and Social Media Technologies,” ID No. Pro00043567, 12/6/2013.

Some sections of chapter 1 and chapter 2 in this thesis have been published in peer-reviewed journal articles, as follows:

Smith, E. E. (2012). The digital native debate in higher education: A comparative analysis of recent literature. *Canadian Journal of Learning and Technology*, 38(3), 1-18. Available at <http://www.cjlt.ca/index.php/cjlt>

Smith, E. E. (2013). Are adult educators and learners ‘digital immigrants’? Examining the evidence and impacts for continuing education. *Canadian Journal of University Continuing Education*, 39(1), 1-13. Available at <http://socialiststudies.com/index.php/cjuce-rcepu/index>

I was responsible for the research design and analysis in these manuscripts, including their composition.

Acknowledgements

My sincere thanks to my doctoral supervisor Dr. Heather Kanuka, whose expertise and encouragement have been extremely valuable throughout my research program.

I would also like to thank the members of the supervisory committee, Dr. José da Costa and Dr. Paul Newton, for their time and expertise, and Dr. Darryl Hunter, for his role serving in the final doctoral examination. Thanks also to those who provided statistical advice: the University of Alberta's Centre for Research in Applied Measurement and Evaluation (CRAME), and Dr. Tak Fung. Finally, my appreciation to Dr. Thomas C. Reeves for providing his time and expertise as the external reader of this doctoral dissertation.

Thank you to my husband and best friend, Richard, for his continued love, support, and encouragement. I would also like to thank my friends and family, especially my parents Peter and Anne Smith, for the support they have provided me throughout this endeavour and in life.

I gratefully acknowledge the support for this research by the Social Sciences and Humanities Research Council of Canada (SSHRC Doctoral Fellowship), the University of Alberta Faculty of Graduate Studies, and the Department of Educational Policy Studies.

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Chapter 1

Introduction: Social Media in Undergraduate Learning

More than a decade after Prensky's (2001a, 2001b) influential articulation of digital natives and immigrants, disagreement continues around such characterizations of students and the impact of such notions within higher education. Proponents of digital native ideas argue that education communities must quickly respond to the unique technology needs and traits of Net generation students (Howe & Strauss, 2000; Prensky, 2001a; Tapscott, 1998, 2008). However, in regard to technology needs and aptitudes, critics of digital native notions argue that in actuality there is much variation both within and between generations (Bennett, Maton, & Kervin, 2008; C. Jones, Ramanau, Cross, & Healing, 2010).

Background and Context

Following discussions of the Net generation (Tapscott, 1998), Millennials (Howe & Strauss, 2000), and digital natives (Prensky, 2001a), such characterizations of students continue to be frequently referenced within higher education and beyond. As a result, ideas of today's students as tech-savvy digital natives who both want and need the latest technologies throughout their learning fuel a debate regarding contemporary understandings of undergraduate learners in higher education research and practice. The overall aim of this study is to address a need identified in the literature (e.g., Bennett & Maton, 2010; C. Brown & Czeriewicz, 2010; Bullen, Morgan, & Qayyum, 2011) to move beyond the current digital native debate by developing research-informed understandings of the ways in which Net generation students may perceive technologies, specifically social media, to be a meaningful part of their undergraduate learning.

Dominant Digital Native Claims

In the late 1990s and early 2000s, discussions emerged about the Net generation (Tapscott, 1998) or Millennials (Howe & Strauss, 2000) as students who both think and act differently due to their supposedly superior technology skills and knowledge. A review of the literature (E. Smith, 2012) reveals that several key claims of the Net generation that originated in the digital native debate from the turn of the millennium (e.g., Frand, 2000; Oblinger, 2003; Oblinger & Oblinger, 2005; Seely Brown, 2002) remain influential today in research and in practice. As illustrated in a comprehensive review of the literature outlined in chapter 2, eight dominant digital native claims have comprised the recurring rhetoric underlying the generational-technology assertions frequently embedded within contemporary higher education research and practice. Digital native proponents employ recurring claims to argue that today's undergraduate students are unique as a result of digital immersion, and are based on the following perceived needs to recognize and adapt to the Net generation as: 1) possessing new ways of knowing and being; 2) driving a digital revolution transforming society; 3) being innately or inherently tech-savvy; 4) multi-tasking, team-oriented, and collaborative; 5) native speakers of the language of technologies; 6) embracing gaming, interaction, simulation, and social media; 7) demanding immediate gratification; 8) reflecting and responding to the knowledge economy. As a part of such characterizations, Net generation students are often depicted as quintessential users of social media, even though research shows that Net generation students are not big users of Web 2.0 (Kennedy et al., 2007), and often lack certain digital competencies (Cabero-Almenara & Marín-Díaz, 2014). Although these dominant claims began around the start of the twenty-first century, as discussed in chapter 2, such characterizations of students continue to impact and influence higher education research, policy, and practice today.

Rationale

More than ten years after Prensky's work on digital natives, the new generation of students generally born after 1980 that embody technological savvy, and digital immigrants, the older generations of educators generally born before 1980 who lack technological savvy, disagreement remains concerning the basis of such characterizations and the implications of such assertions for education. Critics such as Bennett and Maton (2010) have argued that, regardless of the widespread uptake of these ideas, there has been an uncritical acceptance of the Net generation as digital natives that is not based on sound research evidence. Furthermore, academic criticism of the digital native has problematized an underlying technological determinism informing such ideas (Buckingham, 2011; Oliver, 2011; Selwyn, 2012). Since recent evidence has now debunked the digital native (C. Brown & Czeriewicz, 2010), there is a need for research that informs educational theory and practice by investigating learners' perspectives regarding whether and how they make meaning via social media technologies (SMTs) within their own learning contexts. Indeed, though the Net generation is known to use many of these SMTs on university campuses today, "most universities have barely conceived the educational potential of these technologies much less anticipated and prepared policies to enable their use" (Herrington, Reeves, & Oliver, 2010, p. 10). To move beyond the digital native debate, those in higher education can better understand the Net generation's perspectives on, and uses of, these technologies by asking students directly what they see as meaningful in the context of their learning.

Moving Beyond Digital Native Discourse

The importance of developing research-based understandings of Net generation student perspectives of technology comes to the fore as an issue that warrants further exploration since,

despite a growing body of evidence challenging notions of the digital native, unevidenced ideas of digital natives are often embedded within the assumptions of contemporary research on student perceptions of technologies (e.g., James, 2011; Kruger, 2010; Kumar, 2009). Digital native views also appear in visioning documents that shape higher education decision-making. For example, within a recent University of Alberta (U of A) information technology (IT) document, technology investment was portrayed as urgent due to the rationale that, unlike educators, today's unique generation of students "embrace emerging technologies that enhance their lives and discard older processes that no longer suit their needs" (University of Alberta, 2011, p. 1). Yet, such technology visions also reflect notions of students as digital natives that are critiqued for being unsupported by empirical or theoretical evidence (e.g., Bennett et al., 2008). Further research that investigates the ways in which students make meaning of learning with SMTs in different contexts, from their point of view, can help address these issues.

SMTs in Academic Contexts

Digital native arguments are often used as a warrant for adoption and integration of emerging web technologies, particularly SMTs that fall under this umbrella of emerging technologies, in higher education settings (e.g., University of Alberta, 2011; Veletsianos, 2010). As Saeed, Yun, and Sinnappan (2009) stated, although the adoption of these technologies is on the rise in academic settings, a major obstacle remains to be "the limited understanding of learners' characteristics and perceptions about technology use" (p. 98). Compounding such issues is the need for further research exploring specific SMTs in the context of particular academic disciplines (Delello, McWhorter, & Camp, 2015). As such, the picture of what technologies students view to be a meaningful part of their academic studies, and specifically which SMTs they choose to use for their own learning, is murky. For example, a 2012 study of

undergraduates in the United States (US) from the EDUCAUSE Center for Applied Research's (ECAR) showed that 75% of students say that technology helps them achieve their academic outcomes. However, when asked about SMTs, a majority of students said that they preferred face-to-face communication with their instructors (Dahlstrom, 2012). In 2012, 57% of students reported that they prefer to keep their academic and social lives separate, and these numbers have increased:

In 2014, 73% of students agreed or strongly agreed that they like to keep their academic and social lives separate. This is up from 60% in 2013 and provides context for why just one in three students said they wish their instructors would use social media as a learning tool more, fewer than those who said they wish their instructors would use it less.

(Dahlstrom & Bichsel, 2014, p. 12)

Other recent studies have demonstrated students' separation of academic and social spheres, especially concerning technologies, (Bullen & Morgan, 2015; N. Jones, Blackey, Fitzgibbon, & Chew, 2010), though further is research required to understand the reasons why and how this separation occurs, and how it impacts students' perceptions and uses of social media for learning.

Such contradictory information makes it difficult to know the reasons why students may view particular technologies to be meaningful to their learning, and why they may separate certain SMTs from their academic lives. These contradictions continue in other recent findings, including an ECAR research report that showed fewer than 50% of student respondents indicated using social media as a learning tool (Dahlstrom, Brooks, Grajek, & Reeves, 2015, p. 25). A strong resistance to social media in learning has also been reported in Canada, with a recent study from Dalhousie University's Centre for Teaching and Learning reporting that a "majority of teachers (62.63%) were in disagreement with the use of these [social media] tools, which was

similar to the students' response (66.32%)" (Sehatzadeh & Le-May Sheffield, 2014, p. 17).

Given widespread news coverage of social media in higher education, such as the media coverage of a troubling Dalhousie's dentistry student Facebook group called the *Class of DDS 2015 Gentlemen* (CBC News, 2015), it is clear that students, educators, and administrators in post-secondary institutions alike are aware of widespread Facebook use in higher education, even if there is reluctance to include social media in the formal curriculum.

Since findings show that students can and often do have positive perceptions of technologies in academic settings, while at the same time noting the negative aspects of SMTs and the need to be selective about communication modes to connect to instructors and other students, EDUCAUSE recommends that institutions should "understand which innovations they value most" (Dahlstrom, 2012, p. 4). Relatedly, a key finding from ECAR's recent undergraduate IT study shows that "meaningful and intuitive use of technology for academics cannot be assumed, even when a technology is widely available or used by students in other contexts" (Dahlstrom et al., 2015, p. 6). To this end, this study aims to understand student perspectives and uses of SMTs in meaningful ways for their learning. By further investigating the reasons why students may or may not choose to use social media for learning, educators and administrators can make informed institutional decisions impacting educational practice in higher education.

With the increasing adoption of emerging web technologies, especially SMTs, in academic settings (Saeed et al., 2009), what remains is a need for research that goes beyond usage statistics alone to investigate more deeply whether and how learners make meaning with technologies such as social media in their own learning. Therefore, this study addresses these research gaps by exploring student perceptions and uses of SMTs framed in the context of

making meaning processes in their learning. By asking not only *what* characteristics inform the SMTs students choose to use, but also *why* students view SMTs to be a meaningful part of their learning, this study goes beyond existing research on technology usage and frequency that has adopted common digital native notions. As Brooks and Brooks (1993) stated, “we construct our own understandings of the world in which we live. We search for tools to help us understand our experiences. To do so is human nature” (p. 4). Thus it is important to understand the reasons why students may perceive SMTs to be meaningful, and what SMTs they choose to use (or not use) for their university learning. This helps us to reframe important questions of learning in terms of why and how students make choices and construct their understandings, rather than in terms of technological determinism.

Purpose and Research Questions

This study investigates undergraduate learner perceptions and uses of social media, particularly the specific SMTs that learners may view to be a meaningful part of their learning. The research questions guiding this inquiry include:

(RQ1) In what ways do undergraduate learners from different disciplines view social media to be a meaningful part of their university learning?

(RQ2) What characteristics of social media do undergraduate learners see as contributing to their meaning making during their university learning?

By investigating these questions, this research explores the ways in which learners in different disciplinary contexts may perceive social media to be a meaningful part of their learning.

Theoretical Framework: Social Constructivism

Constructivists understand knowledge to be “constructed by learners as they attempt to make sense of their experiences” (Driscoll, 2005, p. 387). In this way, constructivists see learners

not as empty vessels waiting to be filled with knowledge, but rather as actively seeking meaning (Driscoll, 2005; Jonassen, Peck, & Wilson, 1999). Constructivism accepts two main premises: 1) learners actively construct their own knowledge, and 2) social interactions are an important part of knowledge construction (Woolfolk et al., 2010, pp. 343-344). More specifically, this study employs a *social constructivist* approach, which understands knowledge to be constructed via social negotiation that engages multiple perspectives and experiences (Driscoll, 2005; Woolfolk et al., 2010). Vygotsky's theory of social constructivism is influential here, where meaning is created via interactions between both social (external) and individual (internal) levels (Woolfolk et al., 2010). Emphasizing dialogue and the interplay between inner speech and conversational negotiation with peers, Vygotsky underscored sharing of experiences and perspectives and the importance of social interactions, culture, and language in learning (Woo & Reeves, 2007). In this framework, learning occurs when a person constructs meaning through broader social interactions and contexts (Daniels, 2007; van der Veer, 2007). A fundamental tenet of social constructivism, then, is the process of social negotiation whereby learners co-construct but also internalize meaning.

Description of the Study

The research design used a mixed methods research (MMR) methodology comprised of a qualitative first phase and a quantitative second phase of inquiry. As with many MMR studies, this study deliberately employs a combination of methods to provide the most comprehensive means of addressing the research problem and questions at hand. According to Creswell's (2008) definition, drawing on both qualitative and quantitative approaches, mixed methods is "a broad umbrella term encompassing perspectives that see it as a research method of data collection and analysis, a methodology that spans the process of research from philosophical assumptions to

interpretations, a philosophy of research, and a set of procedures” (para. 2). Building on this definition of MMR as a methodological umbrella, this study employed MMR as a methodology involving a qualitative first phase (semi-structured interviews) using generic qualitative strategies and constructivist grounded theory (CGT) techniques, followed by a quantitative second phase (online survey). The research methodology and methods are further outlined in chapter 3.

Social constructivism, often linked with interpretivism since interpretivist researchers aim to understand interpretations of the world emerging from sets of meanings (Cohen, Manion, & Morrison, 2011, p. 18), also informed the research framework. Creswell (2014) noted that social constructivist research frameworks emphasize the following:

[I]ndividuals seek understanding of the world in which they live and work... These meanings are varied and multiple, leading the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas. The goal of research, then, is to rely as much as possible on the participants' views of the situation being studied. (p. 8)

Within this study, the participants' views and perspectives were the focus of inquiry, as reflected in the research questions and design of the study.

Delimitations: Parameters of the Study

This study focuses on investigating the perceptions of undergraduate learners at the University of Alberta (U of A). Specifically, the study examines undergraduates' perceptions of social media and whether they consider certain SMTs to be a meaningful part of their learning, particularly in context of their discipline. It is not within the scope of this study to examine directly (for example, via interviews) administrators' or educators' perspectives of digital

native/immigrant discourse and SMTs, though such follow-up studies may be valuable.

Additionally, this study focuses SMTs, but does not focus on other emerging web technologies (e.g., social software) such as games, virtual worlds, or mobile software applications outside of social media categories. Further study is required to examine the larger phenomenon of so-called digital natives and immigrants across Canadian contexts, and across other administrator, educator, and student groups.

Social constructivist theories (described further in chapter 3) are used broadly as they relate to the ways in which students construct meaning with technologies, rather than specifically. For example, it was not within the scope of this study to examine specific instructional design techniques, interaction models, or learning outcomes related to educational technologies, including measurement or assessment of learning tasks or instructional strategies, though the results may shed light on these other issues. Additionally, this study did not directly examine the process by which learners use social media (e.g., through observation or pre- and post-test interventions), or whether these uses or processes might result in a change in views or outcomes (e.g., competencies) for particular topics or concepts. Although the data reveal many examples of learning with SMTs in realistic contexts, specific concepts related to authentic learning tasks (e.g., Woo & Reeves, 2007) are not included within the scope of the study. Furthermore, though disciplinary social context is an important part of the research design, and reveals connections to cohort-learning communities as discussed in chapter 6, it was not within the scope of this study to consider particular cultural situations or communities of practice that are often be associated with theories of situated cognition, itself related to aspects of constructivism. While the concept of the zone of proximal development (ZPD) was reflected in students' communication with peers or experts related to real life, detailed examination of the

ZPD is outside the scope of this work. Additionally, it was not within the scope to provide in-depth study or analysis of wider organizational or leadership theories.

Limitations of the Study

This study examined the research questions in the context of a large research-intensive institution, the University of Alberta, located in Western Canada, and therefore should not be viewed as directly transferrable or generalizable, including to other locations or post-secondary institutions with different educational mandates, such as technical colleges or teaching-focused universities. Relatedly, since this study's focus was on undergraduate students at the University of Alberta, the nature of the samples (a purposeful homogenous sample for the interviews, and a non-probability convenience sample for the survey) is a limitation in regard to the wider transferability and generalizability of the findings (Cohen et al., 2011; Patton, 2002). Additionally, it should be noted that the participation of females ($n = 442$, 68.6%) in the survey was higher than the overall percentage of female undergraduates (56% in 2013/14) at the University of Alberta (University of Alberta Data Warehouse, personal communication, October 13, 2015), as well as females (59% in 2011) in the Canadian undergraduate population overall (Statistics Canada, 2011). The study focused on exploring students' *perceptions* of meaning making and social media in their own learning, but did not aim to measure or observe directly students' interactions or performance related to specific educational tasks or instructional design principles (e.g., Woo & Reeves, 2007).

Key Definitions and Terms

This section provides an overview of key terms, supplemented by the detailed explanation of terminology and concepts provided in chapter 2. Given the evolution of these concepts over time, contributing to the general ambiguity around commonly-accepted definitions

of a digital native (Gallardo-Echenique, Marqués-Molíás, Bullen, & Strijbos, 2015), it should be understood that the terms *digital native*, *Millennials* and *Net generation* (or N-geners) can and are often used interchangeably (C. Jones et al., 2010, p. 723). Although there are slight differences in opinion concerning the exact temporal parameters of the generation in question, for the purposes of this study, so-called *digital native* students born in the latter part of the Millennial generation are the focus of the study. Accordingly, this study included undergraduate interviewees aged 18-25 years, born between 1988 and 1996 and therefore included in the latter part of the Millennial generation, in close proximity to the year 1994 that Carlson (2005) notes. This definition of digital natives as those students born after the year 1980 was also used to determine the percentage of survey respondents ($n = 624$, 91.9%) within the digital native category overall.

As noted above, this study focuses on *social media* (also known as social media technologies, Web 2.0, or social networking technologies) that are increasingly used in academic learning environments. Kennedy et al. (2009) noted that “[m]any emerging Internet technologies can be broadly grouped together under the label ‘Web 2.0,’ an umbrella term used to describe web-based applications, including social software tools” (p. 10). Here, social media is the broader umbrella term, whereas SMTs is used to describe specific platforms or tools. Saeed et al. (2009) and Kennedy et al. (2007, 2009) have demonstrated that specific SMTs include blogs (e.g., Blogger, WordPress), microblogs (e.g., Twitter), wikis (e.g., Wikipedia), social networks (e.g., Facebook, LinkedIn), instant messaging (e.g., Skype, Google Chat), social bookmarking (e.g., Digg, Pinterest), and collaborative file sharing (e.g., Google Apps, Dropbox). As Herrington et al. (2010) have outlined, as emerging technologies and cognitive tools, social media “allow the creation of collaborative, shared knowledge...and the development of

participatory cultures” (p. 9). As such, the following definition was used in the study: Social media include applications and websites that allow users to create and share content. Social media also enable users to connect via web technologies or to participate in social networks. A full list of specific SMTs is included in the survey instrument (see Appendix B). These key definitions of digital natives, social media, and SMTs informed the research project.

Position of the Researcher

As an instructional designer and e-learning practitioner who (according to some) may also be considered a digital native, I first became interested in the complex array of student and educator perspectives of emerging learning technologies when I began working in the field of educational technology over a decade ago. I have continued this work in my current role as a Faculty Development Consultant at Mount Royal University, where I also teach a first year undergraduate course. These opportunities have provided me with first-hand knowledge of and experience with the areas investigated in this study.

While I have seen many benefits of educational technologies, I have also seen an increasing risk of over-reliance on these technologies broadly throughout educational settings, which at times may act to merely propel prevalent trends. As Kanuka (2008) has stated,

Often swept up by unbridled – but uninformed – enthusiasm by technological advocates, many decisions by educators are based on following the latest trend. Unfortunately, these strategies often lead to incongruence and inconsistency in action between and among instructors, administrators, and students, and the ensuing disagreements that revolve around the means rather than the ends of education. (p. 111)

When we fail to examine technologies with a critical eye, we risk losing congruency with the pedagogical goals and underpinnings with which such technical initiatives should be aligned.

Rather than simply embrace widespread digital native and digital immigrant distinctions, I believe that we must continue to critically investigate and discuss these issues within our own educational settings. I believe that, if educators and learners are ever to fully realize the transformational potential of social media, we must begin to identify and break down such embedded assumptions by fostering evidence based decision-making within higher education policy and practice.

Epistemological Perspectives

As both a doctoral student and a researcher-practitioner, my goals are essentially social in nature – that is, the purpose of my work is to affect and impact educational practice to achieve progress and transformation for overall social betterment. As such, I believe that the issues of educational practice outlined above are ultimately constructed in social contexts. Therefore, in my own research, I take a social constructivist approach that considers, identifies, and (de)constructs the many perspectives of learning with technology in higher education, from multiple vantage points.

When discussing a theoretical stance, Crotty (1998) notes that epistemological and ontological issues often blend together, and as a social constructivist I acknowledge this relationship between epistemology and ontology in that a reality exists aside from human consciousness but that the world only “becomes a world of meaning when meaning-making beings make sense of it” (p. 10). The common epistemological and ontological thread in my research framework, then, is working to understand this world of meaning through interactions with multiple perspectives in a way that recognizes the construction of knowledge from multiple vantage points of what we know and how we interact. Given this understanding of the research problems in question as socially constructed, it is appropriate that a social constructivist

approach informs the methodologies employed. Aligned with this social constructivist lens, my epistemological stance considers the relationship between who is constructing the research in direct relation to what is being researched. I believe that undertaking this research requires consideration of the dialogical nature of inquiry. The nature of this inquiry, then, considers position, context, and perspectives from multiple viewpoints. Additionally, as mentioned above, I have a desire to connect theory to practice, with the ultimate goal of advancing praxis.

Underpinnings of the Research Process

Crotty's (1998) articulation of the research process guided the study's design, starting from an *epistemological stance* and *philosophical (theoretical) perspective* providing a philosophical foundation, and aligned with the *methodology* and *methods* (further outlined in chapter 3). This study was framed within a constructivist epistemological stance, a research paradigm within which knowledge is understood as constructed through the researcher's interaction with the participants and phenomenon involved in the inquiry (Costantino, 2008). Within constructivism, humans are seen to construct (rather than discover) understandings, and as such the human mind plays an active role in creating models, concepts, and schemes to make sense of human experience ("Constructivism," 2007). Furthermore, though constructivism is often concerned with this meaning making process of the individual mind (Crotty, 1998, p. 58), many constructivists argue that "[w]e do not construct our interpretations in isolation but, rather, against a backdrop of shared understandings, practices, language, and so forth" ("Constructivism," 2007, para. 1). Hence, rather than focusing solely on individual meaning making processes, social constructivism involves individual meaning making in relation to social contexts. Under this broader area of constructivism, this study uses a social constructivist approach, where epistemological questions focus on social constructs, interactions, and

intersections (Costantino, 2008).

Related to the research methodology, the philosophical frame (or, theoretical perspective) that grounds this study is *interpretivism*, also known as the interpretive tradition, where the researcher works to unearth the meaning inherent in human action (“Interpretivism,” 2007). Researchers who use an interpretivist approach look “*for culturally derived and historically situated interpretations of the social life-world*” (emphasis in original, Crotty, 1998, p. 67). Interpretivism is particularly useful for the purposes of this study useful as it avoids an over-theorizing or constraining of the potential research avenues available to address the research questions, either before or during the research process. Thus, interpretivism was intentionally selected, rather than specifying a particular research approach within the interpretive tradition, such as hermeneutics or phenomenology.

Significance

Addressing several needs in the literature as outlined, particularly calls to move beyond the digital native debate, the results of this study provide those within higher education with evidence to inform decision-making by understanding why and how to acknowledge the emerging perceptions and uses of SMTs that are increasingly used in academic settings. Though meaning making is a core tenet of constructivist learning theories, and frequently used in education today, few existing studies provide a specific analysis of the ways in which university students themselves articulate and understand meaning making in their university learning, especially regarding use of SMTs. Perhaps most importantly, the study makes a significant contribution to theories and practice in ways that address an articulated demand for new research on learner perceptions of social media, while the results contribute to building research-informed

understandings of the ways in which undergraduates in different disciplines make meaning and use SMTs as a part of their learning.

Organization of the Thesis

The following chapters detail the research study comprising my doctoral dissertation. This first chapter has introduced the research problems and questions at hand, alongside a description and rationale for the study. Chapter 2 provides an in-depth review and analysis of the literature as it relates to my research framework, as well as issues concerning digital natives, meaning making, and SMTs in higher education today. Chapter 3 describes the research design in depth, including a detailed explanation of the methodology and associated methods. Chapter 4 provides an analysis of the qualitative interview results, and chapter 5 expands on this with the analysis of the quantitative survey component. Chapter 6 discusses the interfacing of the qualitative and quantitative findings of the research study, and considers related implications of and recommendations for these findings. This chapter also includes an integrative analysis of relationships and patterns among and between the phenomena studied (e.g., interview and survey data), and implications for future research.

Summary

As evidence challenging the dominant discourse of the digital native evolves, there must also be renewed recognition that our understandings of learners cannot be so absolute. To this end, this dissertation addresses calls to move beyond the current digital native debate by making room for alternative viewpoints that consider socially negotiated learning and context. My background and experience enable me to contribute relevant knowledge, skills, and viewpoints to engage this area of study, bringing a unique vantage point from which to approach this research regarding undergraduate perspectives and uses of social media in different disciplinary contexts,

with the goal of providing a significant contribution to the corpus of knowledge within educational theory and practice.

Chapter 2

Digital Natives Discourse in Higher Education:

A Critical Analysis of Recent Literature

In higher education today, more than a decade after Prensky's (2001a) influential yet problematic articulation of digital natives and digital immigrants, disagreement remains concerning the validity of such characterizations and the implications of such notions. This chapter provides a comprehensive and critical review of the literature by identifying prevalent and recurring themes emerging from the digital native debate as they relate to teaching and learning with technology issues in higher education occurring both locally and globally. Further, this analysis examines those key digital native themes to identify several important research issues for this study.

Origins of the Digital Native Discourse

Perceptions of the digital native took shape in the late 1990s and early 2000s, when popular writings – mainly those of Howe and Strauss (2000), Oblinger and Oblinger (2005), Palfrey and Gasser (2008), Prensky (2001a), and Tapscott (1998) – began describing an urgent need to recognize and adapt to the characteristics of a new generation of students (Bennett & Maton, 2011; Bullen et al., 2011; Thomas, 2011; C. Jones, 2011; C. Jones & Czerniewicz, 2010). In his influential yet controversial writings, Prensky (2001a) popularized the term *digital natives* (Thomas, 2011), defining them as a young generation of learners who are unique because they have grown up immersed in new digital technologies. At the turn of the twenty-first century, such popular writings began an “unevidenced” (Bennett & Maton, 2011, p. 325) digital native debate, with proponents arguing that this new generation is unique because it has always known

a digital world with the Internet and computers. These digital native proponents claimed that these young students both think and act differently than previous generations.

Although they have been influential and frequently referenced within and beyond the academic literature, it is important to note that several of these sources, such as Tapscott (1998; 2008) and Palfrey and Gasser (2008), were presented in popular venues and have faced academic critiques regarding their research approaches and methodologies (Bennett & Maton, 2011; Bullen et al., 2011; Erstad, 2011). For example, as Herrington et al. (2010) outlined, many of these optimistic generational claims draw from focus groups and surveys of young people from affluent suburbs, at times with their parents present (p. 104). Still, as Thomas (2011) stated, “Like it or not—and increasingly many academics who emphasize the need for a research-led approach to technology integration in education do not—‘Digital Natives’ has retained a powerful and enduring if, albeit, problematical resonance” (p. 3). Even with well-founded academic criticism of such works, as the analysis below will further demonstrate, these writings on digital natives have been and continue to be influential in academia and beyond. As such, this critical review of the literature seeks to understand and interrogate the nature of these claims and to conduct further research that gets at the heart of this problematic resonance.

Operational definitions of digital natives and digital immigrants. Born after 1980, *digital natives* are portrayed as acting and thinking uniquely because they have grown up immersed in and surrounded by digital technologies as a part of their everyday lives, and are said exhibit the following characteristics:

1. Constitute a largely homogenous generation and speak a different language vis-à-vis digital technologies, as opposed to their parents, the “Digital Immigrants;”
2. Learn differently from preceding generations of students;

3. Demand a new way of teaching and learning involving technology. (Thomas, 2011, p. 4)

Within the literature on digital natives, claims that digital natives possess sophisticated ICT knowledge and skills, or that they have different learning styles or preferences, are unsupported by evidence (Bennett et al., 2008, p. 777). Using these warrants, digital natives have been presented in a utopian vision of technology tied to an exoticized picture of liberated young people (Buckingham, 2011).

Digital immigrants are characterized as those people born before 1980, people who knew an analog-only world and still rely on analog forms of interaction, and for whom the communications changes happening via the introduction of digital technologies need to be learned and re-learned instead of easily becoming second nature (Palfrey & Gasser, 2008, p. 4). As demonstrated in an analysis of digital immigrant issues (E. Smith, 2013), problems are often identified not with digital natives, but rather with older generations who display their “digital immigrant accent” (Prensky, 2001a, p. 3) when using new technologies. Digital immigrants are portrayed as being tied to older media, unable to catch up (Buckingham, 2011), and therefore embodying the antithesis of digital natives. Indeed, digital native and immigrant discussions frequently focus on dichotomies distinguishing between those who possess certain qualities (native haves) and those who do not (immigrant have-nots). Furthermore, the nature of digital native discourse itself reflects polarities between digital native proponents who are techno-evangelists and digital native skeptics who are technophobic or dissenters (Thomas, 2011). In this way, the digital native-immigrant debate often reflects polarities and binary positions both via the nature of the arguments being presented and in the metaphors employed to illustrate these points.

Although Prensky himself does not define the parameters of this age group, he does equate digital natives directly with the Net generation, which broadly includes students “born in the 1980s and later” (Oblinger & Oblinger, 2005, p. 1.2). However, there are slight discrepancies between scholars regarding the precise start and end dates of the generation in question. For instance, Carlson (2005) states that Millennials are born between approximately 1980 and 1994 (p.1), while Tapscott (1998) sees the Net generation as an “echo” from the boomers starting in 1977 (pp. 21-22). Howe and Strauss maintain that “millennials are born in or after 1982” (p. 4), lasting up until the year 2004 (Bump, 2014). Regardless of these differences, it should be understood that concepts of the digital native, the Net generation, and Millennials have greatly influenced each other, that these terms overlap and can be, and often are, used interchangeably (C. Jones et al., 2010, p. 723). Given these definitions related to the Net generation, Millennials, and digital natives, it is valuable to consider the key themes emerging from the early, popular, and oft-cited contributions that have shaped digital native discourse.

Key Themes Originating in Digital Native Discourse

Several key themes emerged from the popular literature around the beginning of the twenty-first century, which were subsequently engaged (adopted by some, critiqued by others) in academic and research discourses. As illustrated in a comparative analysis of contemporary literature (E. Smith, 2012), eight dominant digital native claims persist as underlying assumptions often embedded within contemporary higher education research and practice. The following eight dominant claims, often taking the form of common sense notions witnessed within e-learning myths that technology itself drives educational change (Friesen, 2008; Selwyn, 2012), have been used to argue that today’s undergraduate students are unique as a result of digital immersion, and are based on the following perceived needs to recognize and adapt to

digital natives.

Eight Dominant Digital Native Claims:

1. *Possessing new ways of knowing and being.* A persisting claim within digital native discourse is that there is an urgent need for educational institutions (including administrators and educators) and parents to recognize and adapt to digital native learners who possess new learning styles or different ways of knowing and being. This viewpoint sees current problems with education as a part of old ways of schooling (i.e., old ways of being and knowing), often associated with digital immigrants (Frاند, 2000; Howe & Strauss, 2000; Prensky, 2001a; Oblinger, 2003; Seely Brown, 2002; Tapscott, 1998).
2. *Driving a digital revolution transforming society.* Another dominant claim is that there is a pressing need to acknowledge and accept a digital revolution transforming society. Many argue that this revolution is especially evident within and important for higher education (Frاند, 2000; Howe & Strauss, 2000; Oblinger, 2003; Oblinger & Oblinger, 2005; Prensky, 2001a; Tapscott, 1998).
3. *Being innately or inherently tech-savvy.* Within digital native discourse, students are seen as innately or inherently tech-savvy, desiring and using digital technology in all arenas, as opposed to older educators who are not inherently tech-savvy (Frاند, 2000; Howe & Strauss, 2000; Oblinger, 2003; Oblinger & Oblinger, 2005; Prensky, 2001a; Prensky, 2001b; Seely Brown, 2002; Tapscott, 1998).
4. *Multi-tasking, team-oriented, and collaborative.* Net generation students are often said to be multi-taskers, team-oriented, and collaborative (Frاند, 2000; Howe & Strauss, 2000; Oblinger, 2003; Prensky, 2001b; Tapscott, 1998).

5. *Native speakers of the language of technologies.* Purported as native speakers of the language of technologies, digital natives are often seen as having unique viewpoints and abilities, especially regarding their unique aptitude for the language of technology (Prensky, 2001a, 2001b; Seely Brown, 2002).
6. *Embracing gaming, interaction, simulation, and social media.* According to digital native claims, gaming, interaction, and simulation (i.e., multi-linear, responsive, visual, and virtual environments) are both embraced by and well-suited to the Net generation (Frاند, 2000; Oblinger, 2003; Prensky, 2001a, 2001b; Seely Brown, 2002; Tapscott, 1998).
7. *Demanding immediate gratification.* The Net generation is often portrayed as demanding immediate gratification, with short attention spans and no tolerance for delays (Frاند, 2000; Oblinger, 2003, Prensky, 2001a, 2001b). However, some digital native proponents have disputed this argument, such as Tapscott (1998).
8. *Reflecting and responding to the knowledge economy.* Proponents of digital native notions often present a strong relationship between the needs of the Net generation and the knowledge economy (i.e., students as consumers, demanding customer satisfaction), specifically within the context of the Information Age (Frاند, 2000; Howe & Strauss, 2000; Oblinger, 2003; Tapscott, 1998).

As the above outlined analysis of key recurring claims shows, just as characterizations and definitions of the Net generation, digital natives, and Millennials have become interchangeable and have influenced one another, the claims made by authors supporting notions of digital natives often overlap and share commonalities. While many recent research studies have focused on particular aspects of these claims, this study focuses on moving beyond this discourse by examining learner perceptions and uses of specific social media in the context of their learning –

an area of research that is needed (S. A. Brown, 2012; Delello, et al., 2015; Hamid, Waycott, Kurnia, & Chang, 2015; Roblyer, McDaniel, Webb, Herman, & Witty, 2010; C. Thompson, Gray, & Kim, 2014).

Social media claims. It is important to consider in this discussion of online learning that many formal courses use a learning management system (LMS), and may not incorporate other technologies that so-called digital natives are purported to be familiar with, such as SMTs, which in the education realm have been associated with “learning 2.0” (e.g., Seely Brown & Adler, 2008). Ideas related to the Net generation as hyper-connected and advanced technology users have been reflected in a calls urging those in higher education institutions to widely adopt and harness the power of SMTs to beneficially transform teaching and learning (e.g., Verčič & Verčič, 2013). Such warrants have articulated this as a need to “meet students where they are” (Caldwell, 2015, p. ii). For example, in Hurt et al.’s (2012) article on the college student perceptions of social networking and the “Facebook effect” (p. 10), the authors stated that “[b]y meeting students where they are, college instructors increase the likelihood that students will be more motivated to engage with their peers and course material” (p. 14). Further illustrating this rhetoric, in their case study of 14 students, Luo and Franklin (2015) advocated for social media that delivers “education 2.0” (p. 235), describing advanced users of social media (specifically blogs and Twitter) as possessing “inherent characteristics,” and in turn recommending that “[e]ducators should take great steps to tap the talents of advanced users and mobilize them in maximizing of the affordances of Web 2.0 tools-supported learning environments” (p. 255). However, as Ravenscroft, Warburton, Hatzipanagos, and Conole (2012) noted, there are substantial challenges to harnessing social media and their related practices for learning that cannot be overlooked. They argued that such challenges can be mitigated by refocusing on two

points: “human beings are complex social animals with lots of individual differences in why they communicate and share, and what they communicate and share; and social media is still ‘just’ a variation on what is fundamentally people communicating with people” (Ravenscroft et al., 2012, p. 181). Indeed, what is needed in discussions of generation and technology in higher education is a focus on why and how these individual differences are important.

Social Media and University Learning

What remains unclear is how so-called native or immigrant learners would comparatively fare in their online learning when using SMTs beyond those within a standard, instructor-led LMS set-up. In their preliminary social media findings, Kennedy et al. (2007) found that “use of collaborative and self-publishing ‘Web 2.0’ technologies that have often been associated with this generation is quite low” (p. 17). Anderson, Poellhuber, and McKerlich’s (2010) Canadian study of social software and self-paced learners confirmed these findings, where the authors stated that the results do not support depictions of digital natives as thinking and behaving in radically new and different ways. In a subsequent study, when investigating differences between student and staff use of emerging technologies, Kennedy et al. (2008) found few differences between these groups, and that overall use of these technologies was low, although they noted that the frequency of technology usage may reasonably be expected to have increased since their survey was carried out in 2006 (pp. 489-490). They found that “there were no role, gender or age effects for technology-based activities associated with Web 2.0 technologies” (p. 484). Here again, Bullen et al.’s (2011) Canadian study found similar results. Building upon these findings, subsequent studies, including this one, moving beyond digital native constructs can bring further insights by investigating the findings that emerge when examining student perceptions and uses of social media technologies in academic contexts today.

Student and faculty reluctance. Despite documented student and faculty reluctance to using social media in formal academic learning, many still view SMTs (e.g., Facebook) as holding great promise for student-faculty interactions (Hurt et al., 2012; Sarapin & Morris, 2015; Verčič & Verčič, 2013), as resources in the learning process (Sánchez, Cortijo, & Javed, 2014), and for wider communication with departments (Vrocharidou & Efthymiou, 2012), and academic advising (Amador & Amador, 2014). For example, Hurt et al. (2012) articulated a Facebook effect with college students in their study, noting that while many students were reluctant to use Facebook at the beginning of the semester, after having Facebook formally implemented as a part of a course students had significantly more positive perceptions. However, Mathieson and Leafman's (2014) study showed that, when asked about their willingness to use social media outside of the LMS, a majority of students and instructors indicated that they are still uncertain or disagree/strongly disagree, and students indicated having less time for social interactions than instructors. Likewise, Deng and Tavares' (2013) study showed that pre-service teachers viewed the LMS as formal, serious, and for homework, versus Facebook as a space to learn from their friends or peers, and expressed reluctance at including the instructor in this space as it "would spoil the free and spontaneous interaction within the group" (p. 172). Additionally, Nkhoma et al.'s (2015) study brought to light Facebook's "negative impact when it comes to the students' perceptions of the quality of the content of student-instructor interaction on their perceived performance" (p. 88). Gettman and Cortijo's (2015) recent article, vividly entitled with a student's plea to "Leave Me and My Facebook Alone!" further demonstrated such student resistance:

Students were the most comfortable when the professor didn't have access to the Facebook page/group, and most uncomfortable with friending their professor. There

appears to be a direct negative relationship: the more the professor is involved with them on Facebook, the less comfortable they are. (p. 6)

These results call into question Hurt et al.'s (2012) Facebook effect. Reluctance from students and faculty to using Facebook in teaching and learning is a recurring theme in the literature, though researchers often explained or made recommendations regarding either accepting or overcoming this reluctance in many different ways. Indeed, as we will see in the following section, several of these themes are interwoven into many subsequent discourses within the field of educational technology. With this understanding of the recurring claims made regarding characterizations of Net generation learners in mind, it is valuable to further examine the recent evolution of this discourse on digital natives.

Consequences of Technological Determinism Within Digital Native Discourse

Technological determinism is often problematically reflected in contemporary educational technology research (Rambe & Nel, 2015), including work on digital natives (C. Brown & Czerniewicz, 2010; Oliver, 2011). The consequence of such appeals to common sense approaches is the obscuring of a more complicated reality that accounts for complex social, political, and cultural contexts (Friesen, 2008, 2009; Selwyn, 2012). Those reflecting technological determinism view technologies as causal agents in and of themselves, where media are independent from social contexts (Dahlberg, 2004), defining human uses and driving societal change (Kanuka, 2008). Other approaches to the philosophy of technology (e.g., the social construction of technology) critique technological determinism as entailing “a teleological, linear and one-dimensional view of technological development...[wherein] social and political interventions in the course of technology are impossible” (Bijker, 2009, para. 5). In

deconstructing the key recurring claims made within the digital native debate, it becomes helpful to interrogate the technological determinism often underlying rhetorical strategies.

Undercurrents of technological determinism. In interrogating the nature and form of the claims comprising key arguments within digital native debates, it becomes clear that technological determinism is a foundational part of digital native discourse. Bennett and Maton (2010) emphasized the importance of critically examining the determinisms embedded in discourses like those within digital native constructs:

Thus, while it may be argued that some have moved on from simple conceptions of an age-based divide, an undercurrent of technological determinism persists in debates....

[C]laims made about young people and their technology experiences [require focus], because it is these claims that are driving the debate about educational change. (p. 322)

Acknowledging the importance of understanding modern-day technology impacts, Bennett and Maton integrated contemporary findings and analyses to illustrate an urgent need to move beyond the digital native debate as it currently exists. Similarly, C. Jones (2011) has critiqued the technological determinism underlying the arguments made by Prensky, Tapscott, and other digital native advocates who have articulated the fundamental transformational powers of technology on universities and society broadly as reflecting a generational break that results from technological change. These researchers have urged moving beyond digital native discourse toward new research-informed understandings of learning and technology.

The “myth” of the digital native (Margaryan, Littlejohn, & Vojt, 2011; Selwyn, 2009; Magrino & Sorrell, 2014; O’Neil, 2014) and related undercurrents of technological determinism remain within post-secondary education, even though higher education research continues to show a "less deterministic relationship between technology and learning" (P. Thompson, 2013,

p. 12) than is presented in digital native discourse. Several recent studies present similar findings challenging deterministic, age-based technology claims. For example, Mizrachi and Bates' (2013) study of undergraduates' academic information management behaviours found that students interact with a variety of traditional (e.g., print) and digital information sources and tools, challenging digital native notions with evidence presenting "a much richer understanding of our college students than the generic stereotype of the always online and plugged-in technophile" (p. 1590). Overall, scholars continue to illustrate the problematic nature of polarizing, deterministic understandings of human engagement with technologies: "[t]he discourse of social media adoption in higher education has often been funnelled through utopian and dystopian perspectives...Consequently, these determinist approaches have obscured a broadened grasp of the situated, socially constructed nature of human interaction with educational technologies" (Rambe & Nel, 2015, p. 629). Such evidence and arguments urge educational technology researchers to change the nature of the debate from one of opposing distinctions relying on limiting deterministic viewpoints to one that is both research-driven and theoretically informed.

Perceptions of meaning making. To address these calls to move beyond the digital native debate as it currently stands, as critics such as Rambe and Nel (2015) have demonstrated, there is great value in instead studying the perceptions of meaning making that help us understand the reasons why young people may or may not use such technologies for their learning. Illustrating the importance of investigating perspectives in context, S. A. Brown (2012) demonstrated problems in the literature around social media in higher education:

The literature...has an essentialist view of how the potential of Web 2.0 should be harnessed in Higher Education, a view concerned more with notions of universal best

practice than with practice oriented to specificities of context, and a view with little regard for the needs of students and academics working in context. (p. 51)

By turning the focus to meaning making, this study intended to avoid essentialist, deterministic tropes underlying digital native discourse. Selwyn (2012) articulated “the importance of recognising the social and interactional circumstances in which digital technologies exist and through which they attain their meaning(s),” (p. 92) and outlined several promising alternatives to technological determinism that also attempt to mitigate the potential for social determinism underlying contemporary e-learning research:

In particular, it would seem appropriate that the socially-shaped nature of the technological is now brought to the fore of academic analyses as a much-needed corrective to the ever-declining quality of contemporary public and political debate over young people, education and digital technology. (p. 92)

To this end, the research study presented here explores the socially-shaped nature of technology via social constructivist approaches for understanding what is *meaningful*, with specific focus on students’ perspectives of the ways in which they make meaning and, relatedly, the ways they engage in social media interactions in the context of their disciplines.

Focusing on affordances. Anti-determinist approaches focus on the *affordances* of technologies (Buckingham, 2011), and refer instead “to what people perceive and signify during their actual interaction” (Selwyn, 2012, p. 89) with technologies, including their possibilities and limitations, their enablements and constraints. An affordance can be understood as a characteristic allowing one to carry out possible (inter)actions via an object or within an environment (physical or virtual); for example, an on-screen button that the user can click or press when using a mouse, trackpad, or touchscreen, whereby the button affords clicking

(Hayman & Smith, 2015). In connecting emerging technologies to educational practice, Willcockson and Phelps (2010) defined an affordance as “the way a technology or software can be used and what it allows the user to do or not to do” (para. 9). Scholars such as Buckingham (2011), Friesen (2009), Oliver (2011), and Selwyn (2012) have argued that such anti-determinist approaches must be brought to the fore of academic analyses of young people, education, and digital technology. The value in such alternative approaches to e-learning research and to studies reframing issues related to digital natives is their contributions to understanding the wider relational interactions and affordances within which digital technologies are ascribed meaning, a main goal of this study.

Digital Native Discourse Today

The impact of notions surrounding digital natives, and the continued use of sources such as those listed above, is evident from the number of references to this material in recent years. For example, according to Google Scholar, Prensky’s (2001a) article has been cited 12,877 times as of March 2016. Within the field of education, a search within the Proquest Education Journals database in March 2016 reveals that Prensky’s (2001a) work has been cited by 1,968 individual documents. Such popular yet controversial conceptions of Net generation students as digital natives have clearly influenced subsequent research generally, and the field of education specifically. However, as the examples provided in the following section demonstrate, higher education research, particularly within the subfield of educational technology, frequently reflects constructions of digital natives that are criticized as largely unsupported by empirical or theoretical evidence (Bennett et al., 2008). Despite the numerous critiques highlighting a lack of critical analysis or evidence, ideas of digital natives have gained exposure in the media, and have continually been taken up in higher education conference programs and workshops (C. Jones &

Czerniewicz, 2010; Hargittai, 2010). In these ways, digital native discourse continues to hold influence within the realm of higher education broadly, and the field of educational technology specifically.

Digital Native Assumptions in Contemporary E-learning Research

Unevidenced claims reinforced by the dominant digital native discourse are often uncritically embedded within the assumptions of contemporary research on student perceptions of emerging technologies. Since early digital native notions continue to appear unquestioned in several recent research studies, it is pertinent to point out that such assumptions do not adequately acknowledge or address new findings on digital native constructs. Indeed, several recent studies on digital learners incorporated early authors, such as Prensky (2001a), but failed to adequately consider current research painting a more complex picture of Net generation students. For example, in introducing his research on Thai undergraduate learner perceptions of mobile learning technologies, James (2011) cited Prensky to state that higher education students such as those in the study “can be characterized essentially as *digital natives*” (emphasis in original, p. 182). Similarly, Kruger’s (2010) study of student perceptions of online learning technologies employed constructions of undergraduate learners as digital natives:

The large percentage of students who are also referred to as digital natives (term used by Marc Prensky (2001) for people who are native speakers of the digital language) and who are comfortable and familiar with modern ICTs, should be taken into account while ICTs for educational purposes are integrated and embedded optimally and innovatively in the learning environments and fabric or first phase systems of HEIs [higher education institutions]. (p. 189)

Here, Kruger not only built assumptions of digital natives into the study, but also advocated for the uptake of digital natives theories in higher education institutions in general. Others, including Kumar (2009), also built assumptions about digital natives into research studies on undergraduate perceptions of Web 2.0 in higher education, and digital native notions related to social media continue to be used in other works (e.g., Buzzetto-More, 2014). Though many other researchers are actively working to address unevidenced digital native concepts through their work, these examples from contemporary research illustrate the continued presence of digital native notions, demonstrating that there is still work to be done to challenge contested but popularized conceptions of students as digital natives that may still appear in higher education studies and reports.

Countering Dominant Conceptions of Digital Natives

In response to prevalent Net generation notions and the influence that such characterizations of students have had within higher education research, there has been growing criticism of digital native theories. Kennedy et al.'s (2007) cross-institutional study of over 2,500 Australian undergraduates showed that, contrary to popular belief, the use of Web 2.0 technologies was actually quite low, and urged further research and critical examination of popular digital native and Net generation claims. One of the most frequently cited sources of criticism is Bennett et al.'s (2008) article, where the authors argued the following points:

Grand claims are being made about the nature of this generational change and about the urgent necessity for educational reform in response. A sense of impending crisis pervades this [digital native] debate. However, the actual situation is far from clear.... We argue that rather than being empirically and theoretically informed, the debate can be likened to an academic form of a "moral panic." (Bennett et al., 2008, p. 775)

Bennett et al.'s analysis concluded that there may be “as much variation *within* the digital native generation as *between* the generations” (emphasis in original, 2008, p. 779). The authors highlighted the lack of evidence relating to other key digital native themes, including a general dearth of evidence supporting claims that Net generation students possess unique multitasking traits, gaming abilities, and learning styles (pp. 779-780). Similarly, research evidence from Margaryan et al. (2011) does not “support popular claims that young people adopt radically different learning styles” (p. 429). These research studies have asserted that mismatched or misleading arguments have informed digital native claims, and urged scholars to approach digital native discourse with caution. With these overarching critiques of digital native discourse in mind, the following section synthesizes key criticisms of digital native claims.

Student diversity and variation. Following the continued proliferation of digital native discourse without a strong body of evidence, several scholars provide a critical examination of digital native discourse. Echoing both Kennedy et al. (2007) and Bennett et al. (2008), C. Jones et al.'s (2010) study of undergraduate learners at five institutions in England showed “significant variations” in technology use amongst Net generation students (p. 722). Several other studies have also demonstrated that students have varied and diverse backgrounds, knowledge, and skills (Helsper & Eynon, 2010; Selwyn, 2009), and showed that “the picture is more complex than the equation of exposure to new technologies and a generational change of attitudes and capacities” (C. Jones & Healing, 2010, p. 344). These researchers investigated common claims made of the Net generation as digital natives, and argued for a more nuanced understanding of digital learners rather than a monolithic grouping of characteristics according to generation.

Socio-economic status and the digital divide. Further research evidence shows that socio-economic factors may be equally or more significant than age in the digital domain. For

instance, C. Brown and Czerniewicz (2010) argued that age is not an important determinant, and suggested that digital native attributes are essentially those of a “digital elite” (p. 357) contributing to the digital divide. In contrast to Kruger’s (2010) reinforcement of digital natives, the authors underscored the importance of having access to and experience with using information and communications technologies (ICTs), rather than generational factors (C. Brown & Czerniewicz, 2010, p. 357). Furthermore, even when controlling for basic web access, Hargittai’s (2010) study found socio-economic status, including race and gender, to be a significant factor and an important predictor of technology skills, abilities, and habits (p. 92). In all of these examples, the findings have countered common constructions painting all of today’s undergraduate students as inherently tech-savvy digital natives.

Networked individualism. Examining digital native notions with a critical eye, as I have argued in a comparative analysis of the literature (E. Smith, 2012), does not necessarily mean rejecting all Net generation claims outright. Rather, it involves careful examination of the complexities associated with such claims, and an awareness of assumptions and values that may need to be further questioned or revisited. A concept that sheds further light on issues occurring with emerging web technologies is that of *networked individualism* (Wellman et al., 2003), which suggests “a move away from place-to-place interaction towards interactions that are person-to-person in character,” (C. Jones, 2011, p. 40), which provides an emphasis on choices that contrasts the deterministic form of digital native debates to-date. Furthering such points, Turkle’s (2011) exploration of digital native issues examined what is both lost and gained for generations experiencing new technologies, and presented a different picture of today’s youth: “Today’s young people have a special vulnerability: although always connected, they feel deprived of attention” (p. 294). Turkle’s examples illustrated how multitasking with devices such

as mobile technologies (which, as she outlined, does not enable better performance or efficiency) happens across generations. Such work on generations and networked technologies have given a more detailed, complex picture of generational-technology issues that urge us to revisit the individual and social dimensions affected by and reflected in such technologies, rather than succumbing to technological determinism.

ICT competency and perceptions of technologies. Recent research has begun to delve further into the evidence regarding such distinctions, particularly related to the ICT uses and perceptions of older adults who are educators. Since few studies examined how adults might develop ICT literacy differently from younger people, Guo, Dobson, and Petrina (2008) showed no statistically significant difference in ICT use between immigrants and natives, and suggested that differences between these groups have been exaggerated and do not hold up in practice (pp. 251-252). Likewise, similar findings questioned prevalent descriptions of native students and immigrant teachers or staff in higher education, and emphasized a “need to develop a more sophisticated understanding about the role technologies play in the lives of both students and staff” (Waycott, Bennett, Kennedy, Dalgarno, & Gray, 2010, p. 1202). The evidence presented in these studies problematizes simplistic divisions between digital natives and immigrants, suggesting that generations do not necessarily display these characteristics in practice, and underscores the need for new forms of inquiry that focus anew on understanding perceptions and uses of such technologies in context.

Digital literacies. As noted above, digital native proponents have posited that young people possess a mastery of the *language* of technology as compared to older generations (Seely Brown, 2002; Prensky, 2001a). Thomas (2011) notes that digital native discourse continues to be intimately tied to ideas around the “emergence of new forms of literacy” (p. 5) that involve

technologies, multimodalities, and semiotic domains extending beyond traditional forms of reading and writing. However, many scholars have warned against an assumption that all students today are digital natives who possess mastery of digital literacies or competencies with new media and emerging technologies. In regard to digital literacy claims, several recent research studies present a varied picture of young peoples' digital literacy knowledge and skills challenging digital native descriptions, and show that not all young people uniformly possess digital competencies (Cabero-Almenara & Marín-Díaz, 2014; Bullen et al., 2011; Erstad, 2011; Thomas, 2011; Kennedy et al., 2009; Kennedy & Judd, 2011). Demonstrating the issue in greater detail, in their report on recommendations for digital literacies in Canada, the Media Awareness Network (2010) stress that the digital native distinction "is not particularly useful because as with any medium of communication – whether it be writing or reading or speaking – an individual must still acquire the necessary skills in order to use digital media technologies effectively" (p. 10). Thus, although proponents have presented digital natives as inherently possessing digital literacy skills due to their age, a number of research studies instead demonstrate that age alone is not a determinant of one's digital literacy skills.

Examining the Canadian Context

As these sources demonstrate, the digital native debate has occurred worldwide, in countries such as Australia, England, the United States, South Africa, Thailand, and beyond. In addition to considering a general chronology illustrating the prevalence of digital native discourse in higher education, and the continuing debate surrounding the validity of characterizations of undergraduate learners as digital natives, for this study it is important to examine this debate as it applies to a Canadian context.

Evidence Concerning Digital Natives in Canada

Despite these critiques of digital natives, there is currently limited research on digital native issues in Canadian contexts. Taking on this issue, a Canadian research team has conducted a study of digital learners at the British Columbia Institute of Technology (BCIT). Observing that popular notions of Millennials were being used as the foundation for pedagogical and technological developments, Bullen et al. (2009) investigated learner traits and preferences as compared to digital native conceptions. Though physical and technical infrastructure appeared as important issues, they concluded the following:

Students rarely identified a technology as a need...if their basic needs were not being met, technology was not a focus of their concerns.... [ICT] preferences of BCIT students are not age or generation related. While there seems to be a general student technology toolkit across BCIT programs, their use was driven by other factors such as the student and instructor dynamic within a course or program, the technical requirements of the discipline, and the affordances that a tool provided within a given context. (pp. 9-10)

In another study of first-year learners at a Canadian university, Gabriel, Campbell, Weibe, MacDonald, and McAuley (2012) found “discrepancies between the expectations of students and professors regarding the use of digital technologies within the classroom setting” (p. 12), and pointed to a potential need for enhanced kinds of professional development. These research findings from various contexts ultimately counter the monolithic characterizations of native and immigrant generations in Canadian post-secondary environments, and illustrate the importance of further research regarding these nuances in different Canadian settings.

Following these preliminary findings, Canadian practitioners and private research groups have begun to challenge mainstream digital native messages. In a report on e-learning in

Canadian higher education published by Higher Education Strategy Associates (HESA), Rogers, Usher, and Kaznowska (2011) presented quantitative results from their online survey of 1,370 undergraduates at degree-granting institutions across Canada:

These [findings] do not quite sound like the views of the “digital natives” we have heard so much about.... However, while this all provides grounds for suspicion with respect to glib claims about digital natives, there is not enough evidence here to dismiss the notion entirely. (pp. 17-18)

While further research on these claims is needed, initial information from this report highlighted that, while there are substantial impacts of digital technologies in higher education settings, a more careful examination of the reasons why learners may value some technologies over others is needed. Taken in conjunction with the criticism of digital native notions from Bullen et al. (2011), these findings further underscore the need for Canadian research on undergraduate perceptions of emerging technologies (e.g., SMTs) that can inform theory and practice. As the digital native debate continues in Canada and beyond, the evidence to-date demonstrates that there is by no means clear confirmation of undergraduates’ technology needs and preferences in different learning contexts.

Examples Within Canadian Post-Secondary Institutions

Digital native proponents often espouse a perceived need for institutions to quickly integrate emerging technologies to meet the needs of twenty-first century learners – or risk being left behind. In addition to pervasive digital native discourse and assumptions within contemporary research, there has been widespread uptake of digital native-immigrant constructs in higher education initiatives and visioning documents. For example, closely echoing Oblinger and Oblinger’s (2005) influential publication, a recent University of Alberta visioning document

outlined support for IT investments on the basis that, unlike educators and staff who are within the “parent” generation, today’s unique generation of students uniformly “embrace emerging technologies that enhance their lives and discard older processes that no longer suit their needs” (2011, p. 1). Such visions based upon faulty digital native warrants are not limited to the University of Alberta, but rather have been witnessed in other Canadian post-secondary settings. For example, Bullen et al. (2009) reported that at BCIT, ideas of the Net generation as digital natives informed decision-making for student technology initiatives: “some of the technological and pedagogical implementations of this initiative were being based on the popular description of the Millennial learner, and we recognized the need to assess the accuracy of this description in relation to our own students” (p. 2). These examples demonstrate how digital native discourse affects and becomes a part of visioning and decision-making in Canadian post-secondary institutions.

Similarly, the U of A IT visioning document uses generational distinctions to show “the growing generation gap between the ‘student’ generation and the ‘parent’ generation” (2011, p. 1). It presents the student generation as associated with immediacy, “open” information, and digital communications (e.g., Google Apps and social networking), and the parent generation with traditional or analog communications (e.g., print, face-to-face) and “private” information (University of Alberta, 2011, p. 2). While the University of Alberta’s IT visioning document does not overtly refer to students as being digital natives, in articulating the differences between generations in this way, the discourse clearly reflects several dominant digital native claims including such characteristics as the students’ need for immediacy, a shift away from face-to-face connections, etc. Such distinctions between younger and older generations reflect those digital native-immigrant claims made by Tapscott, Prensky and others. Ultimately, the discourse

emphasizes an urgent need to transform and revolutionize its systems, to quickly adapt to the student generations innate habits, needs and wants – or jeopardize future progress by becoming “irrelevant.” Certainly, this goal of transforming education through technology is an aspirational one. However, as argued in chapter 1, if educators and learners are to fully realize the transformational potential of learning technologies and achieve praxis, we must reflexively understand the meaning of such stated and unstated assumptions embedded within prominent educational and technological theories and practice. To this end, this study looks to discover what can be learned by taking an evidence based approach in critically investigating and analyzing students’ perspectives and uses of social technologies within educational settings.

As the preceding analysis and discussion demonstrates, perceptions of generational-technology issues have framed much recent discourse in post-secondary arenas. The above examples illustrate viewpoints within the dominant discourse presented in research and higher education planning. Related to this deconstruction, we must also aim to reconstruct, rearticulate, and reconsider alternative approaches that acknowledge different understandings of the needs and values informing use of technologies for learning, particularly from the learners’ point of view. The next section of this chapter examines alternative frameworks for acknowledging and incorporating the social construction of knowledge in ways that help investigate the distinctions framing undergraduates as digital natives.

New Directions for Digital Native Discourse

Despite a large body of new evidence challenging digital native notions, those authors who originated ideas of the Net generation as digital natives continue to affirm and even build upon their previous definitions of generational characteristics rather than discard them. For example, while Prensky (2009) recently conceded that the digital native versus immigrant

distinction is becoming less relevant, he has articulated a need to create “a new set of distinctions” between technological haves and have-nots, and viewed technological enhancements (such as digital implants, and abilities to mine/store data) as a requirement for what he termed “digital wisdom” (p. 1). The discourse from thinkers like Prensky and Tapscott continues to be engaged in educational technology arenas (Thomas, 2011), and reinforces distinctions that rely upon the same tropes of technological determinism by contrasting those who possess certain beneficial technologies and technological abilities against those who do not.

In light of the continued presence of technological determinism within such discourses, how can we address growing calls to move beyond the digital native debate as it currently exists? Given the large body of recent research evidence challenging many of the original digital native claims, instead of working to further test existing digital natives characterizations, I argue that we must move to a post-digital native debate era by reformulating, reframing, and reinvestigating perspectives of digital learners in younger generations, by moving away from determinist and reductionist approaches to research regarding these issues. To this end, the following section critiques recent reconceptualizations of digital natives in the research literature.

Alternative Typologies? Nuances of Undergraduate Learners

In addition to addressing this gap in rich theoretic notions of digital learners, other researchers have begun to plot alternative typologies and Net generation types. For example, in their study of Australian undergraduates, Kennedy et al. (2010) argue that we might see beyond the digital native-immigrant dichotomy by understanding “four distinct types of technology users: *power* users (14% of sample), *ordinary* users (27%), *irregular* users (14%) and *basic* users (45%)” (emphasis in original, p. 332). While there may be promise in considering new types of learners that do not rely solely on digital native constructs, the complexity of Net generation and

digital native notions requires more than technology usage types and frequencies alone. The complex aspects of learner, administrator, and educator experiences, and the perspectives that reflect and inform those experiences, must be considered when reframing and reworking existing digital native constructs in ways that avoid the dangers of deterministic binaries or context-free typologies. White and Le Cornu (2011) have attempted to reframe digital native distinctions by reworking the native-immigrant typology via a visitors-residents continuum, an analytical framework that considers tools and places that inform and reflect the motivations behind using technologies. While White and Le Cornu's efforts with visitors and residents do provide a potential alternative to traditional native-immigrant binaries, further research of this and other theoretical continua needs to be conducted as related to practice. Gallardo-Echenique et al. (2015) argue for simply using the term "digital learners" to more broadly unify many different constructs related to the idea of digital natives. These efforts have begun to work toward possible alternatives to digital native discourse, and such possibilities may pave the way for further theoretical and empirical studies that build rich, nuanced, contextualized, and authentic understandings of undergraduate learners and technologies in higher education contexts.

Moving Beyond the Digital Native Debate

From a constructivist standpoint, meaning is neither discovered, nor created – rather, it is constructed (Charmaz, 2014; Crotty, 1998). The ways in which learners make meaning via their own perspectives of technologies both reflects and affects the ways in which they construct meaning in their undergraduate learning. Since philosophies and meanings are often tacitly held, there is value in understanding students' perspectives and articulations of these meanings and their meaning making processes to understand more richly the reasons why undergraduates choose to use, or not use, social media in their own learning.

Researching Undergraduate Perceptions of Meaning Making

There is value in understanding the relationships between meaning making and learning, as demonstrated in the following:

- Examining *student perspectives* regarding technologies in their learning that considers “[e]pistemologically, what motivates our efforts to make sense of the world?” (Jonassen, Strobel, & Gottdenker, 2005, p. 21);
- How learners *construct their own understandings and representations* of the technologies they experience within their higher education contexts, qualitatively through their own stories or explanations (Driscoll, 2005; Jonassen et al., 2005);
- How *domains or disciplinary contexts* may shed cultural or social insights on digital native issues, and so that we may also be better comprehend broadly how student “knowledge is organized around first phase concepts or ‘big ideas’ that guide their thinking about domains” (Bransford, Brown, & Cocking, 1999, p. 36).

The value of a constructivist approach to these issues – to move beyond the digital native debate – is discussed in further detail in chapter 3.

Relationship to the Research Study

Given the above context for further examination of the digital native debate, several main research motivations inform the rationale for this inquiry, with the overarching goal of moving beyond digital native discourse as it exists today. In particular, five extant research gaps provide a rationale for further study of these issues, as described below. First, given concerns regarding the research approaches (e.g., methods and methodologies) used within earlier digital native studies described earlier in this chapter, the research design in this study works to avoid such issues. For instance, this research is situated in the context of a higher education setting, and

employs research methods that do not rely solely on ICT as a requirement of data collection and analysis.

Second, there is a lack of research considering how different perspectives inform and reflect these digital native issues. For example, Bullen et al. (2011) noted that much research on digital natives considers perspectives largely drawn from the United States. Compounding this problem is the lack of e-learning research comparing different viewpoints across disciplines: “Many e-learning research paradigms focus on constructs that cut across disciplines, perhaps implicitly downplaying disciplinary differences” (G. Smith, Torres-Ayala, Heindel, 2008). Relatedly, there is a need for further research exploring “specific social media technologies within particular academic disciplines” (Delello et al., 2015, p. 178). To address these issues, this research study contributes to furthering our understanding of different learners by examining student views in varying disciplines within a large, Canadian, research-intensive university.

Third, many studies of emerging technologies study phenomena at a single point in time, then frame pedagogical discussion around the emergent and evolving nature of technologies being used (e.g., Veletsianos, 2010). As a result, such studies often fail to consider how other factors, such as emergent social or epistemological dimensions, may affect different exposure to or experiences with technologies (C. Brown & Czerniewicz, 2010; Hargittai, 2010; Wei-Ying, Hyo-Jeong, & Seng-Chee, 2010). Thus, rather than focusing primarily on the emergent nature of technologies, my research instead investigates how different constructions of educational technologies may occur as students make meaning via these technologies, for their own learning.

Fourth, there is a need for research that asks learners directly what they see as important. Rogers et al. (2011) show that there has been little research asking Net generation students what they themselves think about learning technologies (p. 1). Thus, this research study asks students

directly what they themselves perceive as valuable, as well as the reasons why they view particular aspects of education and technology as important or meaningful within their own meaning making processes. Finally, since several writings regarding digital natives have come from private research groups (e.g., Rogers et al., 2011; Tapscott, 1998), this study instead engages perspectives *in situ* by working within and across a publicly funded Canadian research-intensive institution. These considerations have reinforced the need to address gaps in contemporary research on digital natives in higher education through new inquiry.

Summary

Descriptions of today's undergraduate learners as tech-savvy digital natives still appear as a dominant discourse within higher education research and practice, both locally and globally. This literature review outlines dominant and recurring digital native constructs, deconstructing the underlying technological determinism that informs such arguments. The chapter also provides a description of the eight dominant yet controversial claims that continue to inform perceptions of Net generation students as digital natives. Widespread yet critiqued conceptions of digital natives are often embedded within the assumptions of contemporary research on student perceptions of emerging technologies (especially SMTs), despite a growing body of recent evidence challenging such notions. When failing to examine the perspectives underlying technology choices and use, educators risk making decisions simply by following the latest trends (Kanuka, 2008). By investigating learner perspectives on and uses of social media, rather than simply following the trends, the results of this study provide evidence to inform future decision-making that meets the challenges of the twenty-first century by considering how contemporary educational technology research and practice might address prospective disconnects in discourse.

Chapter 3

Research Design: A Mixed Methods Approach

As the preceding chapters demonstrate, there have been several recent calls for new forms of inquiry into the digital native debate, particularly within the realm of higher education. This chapter outlines how the theoretical framework guiding this study has addresses the call for new research that moves beyond existing digital native notions by considering different learner perspectives via a constructivist approach. The chapter includes a description of the research design of the mixed methods study, and outlines of the specific research methods that informed data collection and analysis. The mixed methods research approach addressed the following research questions: *(RQ1)* In what ways do undergraduate learners from different disciplines view social media to be a meaningful part of their university learning? *(RQ2)* What characteristics of social media do undergraduate learners see as contributing to their meaning making during their university learning?

Theoretical Framework

A *constructivist* approach informed the theoretical framework of this study. As there are many forms of constructivism (e.g., cognitive constructivism, radical constructivism, etc.), at times creating “chaos in the literature” (Kanuka & Anderson, 1999, p. 1), I have articulated below the type of constructivism employed. Specifically, the theoretical framework guiding this study is *social constructivism*. Within social constructivism, knowledge is understood to be actively constructed via social interactions and experience (Driscoll, 2005; Woolfolk et al., 2010). As basic tenets, this constructivist theory of learning generally relies on two main premises: learners actively construct their own knowledge, and social interactions are an important part of knowledge construction (Woolfolk et al., 2010, pp. 343-344).

Social constructivist theories of learning. The constructivist paradigm guiding this study reflects the centrality of meaning making and social context in learning. As Jonassen and Land (2012) have demonstrated, recent shifts in contemporary theories portray learning as:

- Involving a process of meaning making rather than knowledge transmission: “Making meaning from phenomenon and experiences involves dissonance between what we know and what we want or need to know.... Knowledge that is personally or socially constructed is necessarily owned by and attributed to the meaning makers;”
- Reflecting the social nature of the meaning making process: “just as the physical world is shared by all of us, so is some of the meaning that we make from it...meaning making is a process of social negotiation among participants in any activity.... Learning is inherently a social-dialogical process.” (pp. ix-x)

Learning therefore occurs when a person actively constructs meaning through broader social interactions and contexts (Daniels, 2007; van der Veer, 2007). As such, a fundamental tenet of social constructivism is a socially negotiated process through which learners co-construct meaning. Related to this (co)construction of meaning wherein learning is a social-dialogical process, Calderón (2009) describes meaning making (and thus learning) as a social practice informed by socially situated activities and processes: “the term meaning-making reflects an integrated, contextualized and transformative way to understand social practices” (p. 153). Such understandings of social constructivism, and related definitions of meaning making, have informed this study.

It is prudent to note that, while many scholars have worked to further develop constructivist theory, Vygotsky’s theory of social constructivism has been foundational in the field of education. As Woolfolk et al. (2010) note, Vygotsky’s theories have “had a great

influence on developing strategies for enhancing learning using computer technology....

Learning theorists have begun to view the computer, and in particular the social connectivity of this technology, as a tool that can be harnessed” (p. 49). Within this theory of social constructivism, meaning is created via interactions between both social or external (e.g., a dialogue with peers) and also individual or internal (e.g., inner speech) levels (Woo & Reeves, 2007; Woolfolk et al., 2010).

Theoretical Foundations of Meaning Making

Further to this articulation of social constructivism as providing the theoretical grounding for the study, it is important to acknowledge key discussions of *meaning* and *meaning making* from a theoretical perspective. Mezirow’s (1991) seminal work on transformative learning has been influential in regard to constructivist discussions of meaning and meaning making, where he articulates this connection as follows:

Specific constructivist assumptions underlying transformative theory include a conviction that meaning exists within ourselves rather than in external forms such as books and that the personal meanings that we attribute to our experience are acquired and validated through human interaction and communication. Our actions toward things are based on the meaning that the things have for us. These meanings are handled in and modified through an interpretive process that we use in dealing with the things we encounter.
(pp. xiv)

Within constructivism, Mezirow’s transformative theory connects epistemological ways of knowing to an ontological way of being, where meanings and interpretations of what we know and our ontological reality (e.g., our (inter)actions) are constructed and changeable. Furthermore, Mezirow makes an important connection between *meaning making processes* that happen via the

linguistic aspects through which meaning making occurs, as well as how *meaning schemes* (e.g., a specific belief or attitude) and *meaning perspectives* (e.g., sets of meaning schemes) can act as perceptual and cognitive codes structuring the emotional, cognitive, and physical ways we act on our experiences. Many of these conceptions of meaning and meaning making were precipitated by what Mezirow termed a *disorienting dilemma*, an impactful life event sparking “an absorbing process of transformative learning – learning that changed my meaning perspectives or basic ways of looking at the world” (p. xvii). In this way, the disorientating dilemma provides a catalyst impacting our perceptions of the world and how we make meaning it of through our knowledge and actions.

Several other thinkers in the realm of adult learning have adopted theories of transformative learning that engage ideas of meaning and meaning making. For example, in reference to Mezirow’s work, Merriam and Bierema (2013) summarize transformative learning as “essentially a learning process of making meaning of one’s experience” (p. 84). They go on to make other connections to the notion of meaning making beyond transformative learning, including ties to motivation in adult learning, where “meaning may involve making connections cognitively between previous and new knowledge, or it may connect experiences with our values and purposes” (p. 158). Here, meaning is tied to both cognitive engagement (e.g., deep and meaningful learning), as well as contextual consideration of personal experience relating to values, beliefs, and goals.

Meaningful use of technology. In addition to educational perspectives of meaning making via social constructivism, several thinkers, including Jonassen and Reeves (1996) as outlined below, have engaged with the term *meaning* as it relates to technologies. For instance,

Postman (1992) discusses meaning in regard to technology, warning of the dangers reductionism poses:

Machines cannot feel and, just as important, cannot *understand*. . . . It is meaning, not utterance, that makes mind unique. I use “meaning” here to refer to something more than the result of putting together symbols the denotations of which are commonly shared by at least two people. As I understand it, meaning also includes those things we call feelings, experiences, sensations that do not have to be, and sometimes cannot be, put into symbols. They “mean” nonetheless. (emphasis in original, pp. 112-113)

In this way, human meaning differs from the logic processes and computer languages that our technologies are based upon. Human meaning making involves shared understandings, communication, and interactions that involve feelings, emotions, experiences, and values within our own contexts and with other people. Meaning makers may mediate and share these experiences through the use of technologies, such as social media, but to give meaning and bring understanding is an inherently human (rather than technological) phenomenon.

Research Design: Methodology

A research methodology is the strategy, plan, or design underlying and informing the choice of methods that will achieve the intended research outcomes (Crotty, 1998). This study employs a broad umbrella of mixed methods research (MMR) as the methodological approach (Creswell, 2008). Under this methodological umbrella, the first MMR phase uses *generic qualitative* approaches (Merriam, 2009), and also draws on specific *constructivist grounded theory techniques* for investigating the ways in which students create and construct meaning, both individually and socially, in different disciplinary contexts. Building from this first phase, the second MMR phase uses parallel generic qualitative and constructivist grounded theory

(CGT) techniques for analysing open-ended survey responses, and the second phase uses descriptive statistical procedures as appropriate for the quantitative data. Using this combination of methods, this research design provides an investigation into the multiple perspectives of learners and digital technologies that moves beyond traditional digital native distinctions.

Thorough consideration of the methodological design and paradigms within this research framework were undertaken throughout the study. In conducting the two phases of this MMR study, I draw on Creswell and Plano Clark's (2011) description of multiple worldviews in mixed methods, wherein multiple paradigms (rather than a single worldview) are explicitly embraced as a part of a dialectical perspective (p. 45). As noted in chapter 1, the philosophical assumptions that have informed this design evolved from constructivist principles beginning in the qualitative first phase of the study, and also worked to include those additional perspectives needed for identifying and measuring variables and analyzing statistical trends in the second quantitative phase. This approach is commonly used in exploratory mixed methods designs (Creswell & Plano Clark, 2011, p. 87).

Mixed Methods Research Methodology

Mixed methods research is a methodological approach where a combination of methods is intentionally used to comprehensively address the research questions. Creswell's (2008) definition of mixed methods informs this methodological approach:

Mixed methods is defined as research in which the inquirer or investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study.... This definition permits viewing *mixed methods* as a broad umbrella term encompassing perspectives that see it as a research method of data collection and analysis, a methodology that spans the process

of research from philosophical assumptions to interpretations, a philosophy of research, and a set of procedures used within existing research designs such as case studies, experiments, and narrative projects. Overall, this definition has general agreement among leading mixed methods writers today. (emphasis in original, p. 2)

Within this definition of mixed methods research as a methodology, the methods employed for this study are as follows: while both phases address the research questions at hand, the first component of the study focuses the first phase aspects of the research design and questions guiding this study, with the second component conducted subsequently, and both components interface in the results narrative (Morse & Niehaus, 2009). To meet the objectives of this study, the first component includes a qualitative research approach followed by a quantitative research strategy, as explained below.

First Qualitative Research Phase

Under this MMR methodology, the first phase of the study employs a generic qualitative approach that incorporates CGT methods and techniques. Generic qualitative studies—also called basic qualitative (Merriam, 2009), interpretive description (Thorne, Kirkham, & MacDonald-Emes, 1997), and descriptive qualitative (or qualitative description; e.g., Sandelowski, 2000; 2010)—are recognized as one of the most frequently used forms of qualitative research in education (Merriam, 2009), having gained wide acceptance in the past decade (Lichtman, 2010). As Kahlke (2014) has noted, research is not designed on a blank slate, but rather builds upon traditions and ideas that have come before. In this way, the generic approach is aligned with and infused by complimentary theoretical underpinnings (e.g., CGT), with attention paid to unity and congruence throughout the study.

As Lim (2011) has described, educational researchers who are focused on the

participants' *meaning and interpretation* of phenomena, rather than the lived experience itself, choose to employ generic qualitative approaches. Researchers may choose a flexible generic qualitative methodology instead of a more prescribed methodology (e.g., phenomenology); for instance, if the research goals are focused on elements of participants' broader interpretation and meaning processes (Gravett & Petersen, 2007; Lichtman, 2010; Merriam, Mott, & Lee, 1996). A key aim of this study is to provide an examination of undergraduates' perceptions of meaning making in their learning, and so the outcomes of generic qualitative research fit well with the research aim of this project.

Features of generic qualitative approaches. I draw on Merriam's (2009) well-known definition of generic qualitative research to inform the methodological characteristics of this study. Merriam sees the primary goal of generic qualitative research as uncovering and interpreting "how meaning is constructed, how people make sense of their lives and their worlds" (p. 24). More specifically, generic qualitative research focuses on the following:

1. how people interpret their experiences;
2. how they construct their worlds; and,
3. what meaning they attribute to their experiences. (p. 23)

Based on these characteristics, generic qualitative research studies align with constructionist (Merriam, 2009) and constructivist (Caelli, Ray, & Mill, 2003) epistemologies, as well as interpretive approaches to inquiry, particularly for generic qualitative studies of adult development and learning (e.g., Lim, 2011). Thus, researchers who adopt a generic qualitative approach often intentionally focus broadly on inductive strategies with a descriptive outcome (Lichtman, 2010; Lim, 2011). These characteristics support the constructivist and interpretive approaches that inform this study's research design.

Addressing challenges of generic qualitative approaches. Caelli et al. (2003) have noted that generic qualitative research can be understood as “that which is not guided by an explicit or established set of philosophic assumptions in the form of one of the known qualitative methodologies” (p. 4). As such, while many generic qualitative researchers see benefit in avoiding the constraints of traditional methodologies, one of the challenges of generic qualitative is that it may be seen as uninformed by or unconnected to epistemological and other philosophical groundings that are more explicitly reflected in traditional qualitative methodologies. I addressed this potential challenge by taking a two-pronged approach. First, I have reflexively and systematically given attention to congruence within the research design by identifying and aligning the epistemological stance, theoretical perspective, methodology, and methods as informed by Crotty’s (1998) framework for the research process. Second, by recognizing that generic qualitative approaches can intentionally take on “overtones” of other qualitative approaches (Neergaard, Olesen, Andersen, & Sondergaard, 2009, p. 2), including grounded theory, in ways that provide theoretical groundings. As such, I have incorporated CGT techniques that are appropriate for addressing the research questions and supporting the overall constructivist approach.

In alignment with the social constructivist framing of the study, questions within the interviews (see interview guide in Appendix D) reflect the following key characteristics of social constructivism as outlined by Woo and Reeves (2007):

- Active construction of knowledge based on experience with and previous knowledge of the physical and social worlds;
- Emphasis on the need for the ZPD (here referred to as communication with peers or experts related to real life, to reflect participants’ language);

- Emphasis on the influence of human culture and the sociocultural context;
- Recognition of the social construction of knowledge through dialogue and negotiation;
- Emphasis on the intersubjective construction of knowledge;
- Multiple interpretations of knowledge. (Jaworski, 1994; Ernest, 1995, as cited in Woo & Reeves, 2007, p. 19)

Overview of grounded theory. Grounded theory (GT) approaches and techniques are frequently used in research projects, including those within the field of educational research (Thornberg, 2012). Put simply, grounded theory methods “offer a set of general principles, guidelines, strategies, and heuristic devices.... Grounded theorists collect data to develop theoretical analyses from the beginning of a project” (Charmaz, 2014, p. 3). Grounded theory is inductive, comparative, iterative, and interactive – a “systematic method for constructing theoretical analysis from data, with explicit analytic strategies and implicit guidelines for data collection” (Charmaz & Liska Belgrave, 2012, p. 347). Grounded theory originated in the 1960s with the work of Glaser and Strauss’s (1967), *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Following this seminal grounded theory work, more recent constructivist grounded theory has been employed in a range of research projects (e.g., Bryant & Charmaz, 2007; Charmaz, 2000, 2008, 2014; Charmaz & Bryant, 2008; Mills, Bonner, & Francis, 2006a, 2006b). Here, grounded theory techniques have drawn on Charmaz’s (2014) articulation of CGT, which is by nature an interpretive approach, and as such CGT has informed the mixed methods design (Morse & Niehaus, 2009, pp. 94-95).

Features of CGT techniques. CGT is explicitly aimed at studying meanings and processes, emphasizing what people are doing, which “leads to understanding multiple layers of meanings in their actions” (Charmaz, 2008, p. 90). Thus, those who use CGT study how and why

participants construct “meanings and actions in specific situations” (Charmaz, 2014, p. 239). In alignment with the theoretical grounding of this study, CGT assumes an interpretive viewpoint, and asserts that humans construct grounded theories through their past and present experiences and interactions with other perspectives and people (Charmaz, 2014). A key feature of CGT is its focus on processes as consisting of “unfolding temporal sequences that may have identifiable markers with clear beginnings and endings and benchmarks in between” (Charmaz, 2014, p. 17), which is helpful in examining meaning making as a process as investigated in this study.

Within CGT, researchers employ a common set of characteristics, including:

- Enacting *theoretical sensitivity* (where the researcher reconstructs meaning from the data with the participants);
- Engaging *proactively with the literature*;
- Using *constant comparative methods*;
- Employing *coding and memoing* strategies; and,
- Measuring *rigour*. (Mills et al., 2005)

As mentioned above, CGT approaches to the above-mentioned characteristics inform the research methods and techniques used in this study. In particular, the study relies on constant comparison, where the researcher initially analyzes “data with data, progressing to comparisons between their interpretations translated into codes and categories and more data...[which grounds] the researcher’s final theorizing in the participants’ experiences” (Mills et al., 2005, p. 3).

This study employs foundational CGT techniques regarding the use of emerging data. Examples include taking notes from the beginning of the study (Charmaz, 2008), and using an interview guide to frame the semi-structure interviews while allowing for questions that were

sufficiently general (Charmaz & Liksa Belgrave, 2012). Furthermore, CGT coding and memo-writing techniques are employed for data analysis. Theoretical sampling strategies focused on disciplinary categories helped in elaborating the meaning of conceptual categories that developed in the first qualitative phase (i.e., interviews). The integration of these methods and techniques within the research design is described in greater detail in later in this chapter.

Addressing challenges of grounded theory. One main criticism of grounded theory approaches is the delayed nature of the literature review. To address problems associated with delaying the literature review, I consulted Thornberg's (2012) recent work on "informed grounded theory" (p. 243) to incorporate literature review strategies as a part of sound grounded theory techniques, and in alignment with CGT approaches. Therefore, this study engages with the research literature throughout the research process (Thornberg, 2012; Mills et al., 2005).

Second Quantitative Research Phase

The second phase of this MMR study employs a survey design that provides "a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (Creswell, 2014, p. 155). In this study, the purpose of the survey was to gather descriptive information about undergraduates' perspectives regarding social media generally, focused specifically on the second research question: (*RQ2*) what characteristics of social media do undergraduate learners see as contributing to their meaning making during their university learning? Following the qualitative interviews, the survey was useful for gathering information regarding the views of a larger population of undergraduate students (Creswell, 2014) at the University of Alberta, and in identifying descriptive information regarding the characteristics of social media perceived to contribute to students' meaning making.

Features of the survey design. The survey uses a cross-sectional design, enabling the

researcher to perform macro-level analysis while also comparing different groups (Cohen et al., 2011). This cross-sectional design allows for comparison between subgroups organized by three broad disciplinary categories 1) humanities and social sciences, 2) health sciences, and 3) natural sciences and engineering. The purpose of this cross-sectional design is to provide a snap-shot of this undergraduate population's perceptions of the characteristics of social media that contribute to meaning making at a particular point in time, but not to examine causal relationships or the impact of particular interventions. Cohen et al. (2011) have described the several benefits to a cross-sectional design, such as its usefulness for charting aggregated patterns, as well as a stronger likelihood of participation as it is only for a single point in time (p. 273). The survey and related analysis focus on patterns within the same sample of undergraduate students to examine the characteristics of social media that this sample of learners identified. In addition to the data emerging from the first phase interviews, questions within the survey are built upon a revised and refined version of Valtonen, Dillon, Hacklin, and Vaisanen's (2010) categories of social software (see Table 4.2 in chapter 4 for more information) in order to explore social media characteristics.

Addressing challenges of the survey design. Cross-sectional survey designs present many benefits, but also potential challenges, and these have been managed throughout the study. For example, this approach does not indicate causal relationships, nor does it chart individual variations or changes in development over time (Cohen et al., 2011, p. 273). Since causal relationships and changes over a longitudinal period are not within the scope or aims of this study, these challenges do not adversely impact the study. Further details about the sample and specific survey methods are described below.

Mixed Methods Research Design

For this study, the components followed a QUAL → *quan* sequential design, where the first phase qualitative component is conducted before the second phase quantitative component (Morse & Niehaus, 2009, pp. 28-29). Though the study is sequential in nature, close attention was paid to using techniques aligning with the overall research design (e.g., attention to constructivist framings, using constant comparison methods) to approach the MMR cohesively and synergistically (Creswell & Plano Clark, 2011) throughout the study as appropriate (e.g., from the interviews in the QUAL phase to piloting and distributing in the survey in the *quan* phase to final analysis and write-up). As Morse and Niehaus have stated, “[m]ixed method design is systematic. At best, researchers conduct two components, keeping each data set separate until the *point of interface*, or the position in the research process in which the two components meet” (emphasis in original, 2009, p. 55). Therefore, the point of interface for this mixed methods study occurs within the results narrative provided in the discussion chapter.

Research Methods

The first component of this MMR study uses a generic qualitative approach incorporating CGT techniques to conduct and analyze *semi-structured interviews* with undergraduate students. The second component includes quantitative data from an online *survey* that captured student responses to questions regarding meaning making and social media characteristics in their learning. The survey (Appendix B) includes questions and Likert-style rating scales that, as Leedy and Ormrod (2005) have outlined, are “useful when a behaviour, attitude, or other phenomenon of interest needs to be evaluated on a continuum” (p. 185). The rating scales address the research questions at hand by capturing perspectives of meaning making and social media characteristics at a particular point in time and on a continuum.

Setting. The qualitative interviews were conducted with 30 students in a face-to-face environment on the University of Alberta campus, in a quiet location where participants were free from distractions and could feel comfortable to talk openly and honestly. The second phase quantitative component was collected via a brief electronic survey, created through SurveyMonkey. Participants received the survey link via the University of Alberta Students' Digest email list, and thus the survey could be answered in whichever setting that the participants chose.

Sample

I used a purposeful sample for the first phase qualitative component. This sample was homogenous in nature in order to achieve saturation of participants (Cohen et al., 2011; Morse & Niehaus, 2009) who share the characteristic of being full-time undergraduate students from one of areas that fall within the Canadian Tri-Council Agencies' three divisions of disciplinary domains: the humanities and social sciences, the health sciences, and the natural sciences and engineering. Patton (2002) describes purposeful homogenous samples as using a strategy where the purpose is to describe a particular subgroup in depth (p. 235). Since full-time undergraduates in a formal education setting can be considered a subgroup, homogenous sampling was an appropriate fit. The first phase qualitative component involves a sample of 30 undergraduates engaged in full-time studies at the University of Alberta, with ten students from each of the three disciplinary categories. Morse has recommended that if the research topic is "difficult to grab" and complex, it is wise to have a large number of participants, noting that, in general, studies (such as this one) that use grounded theory techniques may need approximately 20 to 30 participants (2000, p. 5). This study follows Morse's general guideline for sample size ($n = 30$) and accounts for qualitative saturation.

The second phase quantitative component involves a non-probability convenience sample, with a total of 679 usable responses. Convenience sampling involves selecting the nearest individuals to serve as respondents, in this case, undergraduates at the University of Alberta recruited via the Students' Digest email lists. Patton (2002) notes that convenience sampling differs from a purposeful sample (as described above for the qualitative phase) because, though it is also a very common sampling approach, convenience samples are "neither purposeful nor strategic" (p. 242). However, Cohen et al. (2011) note that "[c]aptive audiences such as students or student teachers often serve as respondents based on convenience sampling" (p. 156). For this study, the sampling approaches proved successful for gaining saturation of data for the qualitative phase, and in gathering a robust number of survey responses from the population of interest for the quantitative phase.

Inclusion criteria. Since a main focus of this study is to address generational and disciplinary aspects, I applied inclusion criteria according to what groupings of participants might share other important characteristics related to the research questions (e.g., potential sub-groups based on age, discipline, etc.). Therefore, to meet the inclusion criteria of the first phase of the study, participants for the interviews were to be enrolled in full-time undergraduate studies at the University of Alberta, and willing to participate in one interview estimated to be approximately one-hour in length. Students who were born toward the latter part of the Millennial generation – close to year 1994, between the ages of 18-25 years old – as a part of the digital native timeframe were also a part of the inclusion criteria for this phase. The inclusion criteria for the online survey required that participants be undergraduate students at the University of Alberta, and over the age of 18 years old.

Access and recruitment. A call for participants for the first phase interviews was issued to undergraduate students via a number of venues: through the U of A undergraduate research initiative; with permission from instructors to make a brief in-person announcement before the start of their undergraduate classes; and using ads for the study posted widely on main campus bulletin boards. Students received calls to participate in the survey component via a link and brief description distributed using the U of A Students' Digest email list. As approved in the ethics application, students participating in the study could choose to be entered in a draw for one of four iTunes gift cards valued at \$25 each (two gift card incentives offered for the interviews, another two for the survey), following their participation. Contact information for the draw was entered and stored in a Google form that was separate from the data (i.e., not in SurveyMonkey).

Research Ethics Board Approval

This study received approval from University of Alberta's Research Ethics Board (REB). The application to REB included details regarding data storage (e.g., privacy protection, etc.) and informed consent (e.g., explicit consent from participants for use of audio recordings, survey responses, etc.). Names and other identifiers have been removed in this thesis and any resulting publications, with pseudonym placeholders used so that all dissemination of results will contain anonymized data that protects the identity of participants (Mayan, 2009, p. 76).

Informed consent. Congruent with the Tri-Council's (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2010) policy on *Ethical Conduct for Research Involving Humans*, each participant received an information letter and consent form. Accordingly, as the primary researcher, I clearly explained benefits and risks of the study,

emphasized that there was no requirement to participate in the study, and also that there would be no penalties for lack of participation. I also ensured that each in-person interview participant signed a consent form. Online survey participants completed an electronic consent process, with information explaining all specific and relevant details related to informed consent and ethics policies. No participants indicated a wish to discontinue his or her involvement (e.g., for the interviews), though participation was entirely voluntary and could end at any time. For the survey, participants were free to refuse to answer (e.g., skip) particular questions, to quit the survey, or to withdraw from the study altogether prior to submitting the survey. Once survey data was submitted, participants could not have information removed as responses were anonymized and data analyzed in the aggregate.

Data Collection

First Phase Data Collection

The first phase data collection occurred through semi-structured interviews, which are recognized as “the most common qualitative strategy used in mixed method design” (Morse & Niehaus, 2009, p. 127). This involved *intensive interviewing* directed at a conversation that “explores research participants’ perspective on their personal experience” (Charmaz, 2014, p. 56) through the use of a semi-structured interview guide (see Appendix D). Data was primarily collected by digitally recording the audio portion of each interview, and these recordings were subsequently transcribed for analysis. Participants answered questions regarding their perceptions of meaning making and social media in their university learning. Within the semi-structured interview format, the researcher asked each participant to explain what perspectives, views, or beliefs they held regarding SMTs for their own learning (e.g., why some technologies may have helped or hindered their meaning making), and why they might value certain aspects

or characteristics of specific social media over others when constructing meaning. Other questions asked of participants included whether they used any of the identified SMTs for their university learning, and why they would choose (or, choose not) to use them; why they would or would not use SMTs to make meaning in their learning; and finally, whether they think the SMTs they did use were successful in supporting their learning in meaningful ways, and why. Prior to conducting the 30 semi-structured interviews, the researcher piloted the interview with the assistance of a volunteer undergraduate student in order to test the questioning approach and interview guide.

To gather information that generally describes the participants in the sample, the interview contained brief questions on basic demographic information, such as their year of birth, self-identified sex, full-time academic status, and academic discipline. Additional questions asked participants to provide information showing their level of familiarity with the terms used in this study, such as how they would define social media, and whether they were familiar with or used certain SMTs or platforms (e.g., Facebook, Twitter, Ning, etc.). The main intention here was to understand, explore, and probe the themes and ideas that emerged.

Second Phase Data Collection

The electronic survey, created within SurveyMonkey, and distributed via email, asked participants questions in order to collect demographic data, rate perceptions on a continuum, and track perceptions and characteristics of the phenomena of interest. Web-based surveys such as this one are advisable because they have the potential of reaching a large number of participants (Cohen et al., 2011, p. 276). The intention here was to gather information that helped illustrate and describe further the phenomena in question, with the goal of gaining data that the interviews could not fully access alone, and to add another valuable dimension and perspective to the study

(Morse & Niehaus, 2009, p. 31). In terms of the mode of data collection for the survey, the participants received a notification about the survey via email, and could self-administer by entering their responses electronically in SurveyMonkey, providing a fast and easy way for participants to respond at their convenience. The survey was designed to take a short amount of time to complete, five minutes or less.

The web-based survey software allowed for monitoring and tracking of the survey responses as they occurred, with each response logged and assigned a unique ID number (Sue & Ritter, 2007, p. 101). To encourage a strong response rate, the researcher issued a follow-up reminder about the survey (Sue & Ritter, 2007) using the same email list following the initial invitation. To ensure that the questions in the survey were clearly worded and sequenced, the researcher conducted two pilots of the survey prior to the final survey distribution. The first pilot survey ($N = 22$, Cronbach's alpha of 0.88) was conducted mainly with volunteer qualitative participants following their interview, while the second pilot survey ($N = 15$, Cronbach's alpha of 0.90) was conducted using volunteer undergraduate students outside the qualitative sample. The final survey instrument ($N = 679$, Cronbach's alpha of 0.92) is included as Appendix B.

Data Analysis

The following section describes data analysis for both the qualitative and quantitative phases. Beginning with the first phase, data analysis of interview transcripts employed qualitative thematic coding (Charmaz, 2014; Merriam, 2009). The second phase analysis of the quantitative survey data occurred via quantitative analysis features in the Statistical Package for Social Sciences (SPSS) Statistics software version 22.

First Phase Data Analysis

Regarding qualitative data analysis, Cohen et al. (2011) have noted that a “major feature of qualitative data analysis is coding” (p. 559). Previous descriptive qualitative studies have successfully used these forms of data analysis (Mayan, 2009; Sandelowski, 2000). Julien (2008) describes qualitative data analysis techniques as follows:

When analyzing qualitative data such as interview transcripts, analysis across the whole set of data typically produce clusters or codes that translate into “themes”... Those themes may have been identified a priori, so that the researchers seeks evidence for participants’ expression relating to those themes, or may simply emerge from the analysis of the transcripts. (p. 120)

In alignment with the overall research design, coding reflects participants’ perspectives by using their language and words, and is an emergent process (Charmaz, 2014). Though data for each phase of the MMR study were collected sequentially, this study collection phase was informed by *constant comparison methods* (Charmaz, 2014, p. 132) throughout, wherein the researcher made ongoing comparisons between data to find similarities and differences (e.g., by comparing early and later interviews, etc.), especially for the interviews and in the survey instrument development. Specifically, the following data analysis techniques were employed:

- constant comparison methods that enable the researcher to compare data at each stage of analysis (Charmaz, 2014, p. 132);
- coding techniques, including *initial coding* aimed at exploring emergent themes, and *incident-with-incident coding* to understand and compare the properties and contexts of incidents within the data (Charmaz, 2014, pp. 128-136). This was followed by overall thematic coding to construct categories or themes (Merriam, 2009), wherein

focused coding techniques were used for conceptual developments and *axial coding* techniques were employed to relate categories and sub-categories of data. (Charmaz, 2014, pp. 140-150)

Connecting the two phases of this MMR study in this manner allowed the researcher to pay close attention to pacing and iterative interaction between data collection and analysis, to form “a mutual interaction between what is known and what one needs to know” (Morse, Barrett, Mayan, Olson, & Spiers, 2002, p. 12).

The qualitative results formed a rich description, also known as a *thick description* (Cohen et al., 2011; Mayan, 2009), of the various themes and patterns of the undergraduates’ perceptions of meaning making and social media in their learning. Thick description can be understood as “as a means to discover and reveal the depth of meaning that human actors inscribe in their language and actions” (W. Thompson, 2001, p. 66). Thick description can also be defined as follows:

In interpretive studies, thick descriptions and inscriptions are deep, dense, detailed accounts of problematic experiences. These accounts often state the intentions and meanings that organize actions. Thin descriptions, in contrast, lack detail and simply report facts. (“Thick Description,” 2001, p. 99)

Several meanings reflected in the thick description are presented in the qualitative findings and discussed below. The interview data were transcribed into electronic formats, allowing for analysis using through the NVivo version 10 software application.

Second Phase Data Analysis

Analysis of the quantitative data aligned with the survey format, including descriptive analysis of the survey responses as they connect to the research questions. Before data analysis,

the researcher performed appropriate data cleaning on the survey results to ensure identification and correction of errors where appropriate, and to screen, diagnose, and treat these errors (Sue & Ritter, 2007, p. 106). While there were 735 overall responses to the survey, participants who selected to disagree for the consent ($n = 2$), or who indicated that they were not an undergraduate student ($n = 54$). These were removed from the data set based on inclusion criteria, resulting in a total of 679 usable responses. For questions with multiple response options, missing values, such as those options without a response, were treated as appropriate via SPSS analysis software (i.e., applying a code of 1 or 0 for present or absent when analyzing items with multiple response options). Items with Likert-type rating scales ranged from 1 (*strongly agree*) to 5 (*strongly disagree*). The analysis of the survey focused on the presence or absence of certain descriptions or characteristics of meaning making and social media as indicated by participants, as well as any differences, relationships, or patterns within or between groups (e.g., disciplines). The researcher analyzed open-ended survey responses using the generic qualitative and CGT techniques (e.g., coding, constant comparison), congruent with the interview analysis.

Statistical tests for correlation. A Pearson correlation is a descriptive statistical test that is one of the best-known and most frequently used measures of association (Cohen et al., 2011). Since exploring relationships via correlation (not causation) is a key focus of the study, a Pearson correlation test was conducted to determine the association between variables connected to the research questions and hypotheses related to the study, as outlined in Table 3.1 below.

Table 3.1

Statistical Tests for Correlation

Hypotheses Tested	Test Conducted
There is no significant difference between:	
Ways of Making Meaning and Social Media Use	Pearson Correlation
<ul style="list-style-type: none"> • totals for ways of making meaning (Q10 total) and specific social media use (Q13 total) in university learning. 	
Age and Meaning Making	Pearson Correlation
<ul style="list-style-type: none"> • age (Q7) and perceptions of social media technologies as important (Q14) for university learning. • age (Q7) and perceptions of social media characteristics as useful (Q15) for university learning. • age (Q7) and perceptions of social media characteristics to help make meaning (Q16) of university learning. 	

Rigour

The researcher relied on verification strategies confirming validity to ensure rigour throughout the first and second phases of the research project. Validity can be applied to both qualitative and quantitative methods; for instance, for the qualitative phase, validity was addressed by obtaining rich, thick description and through the application of verification strategies (e.g., member checks, etc.). For the quantitative phase, validity occurred through “careful sampling, appropriate instrumentation and appropriate statistical treatments of the data” (Cohen et al., 2011, p. 179).

While there is some debate about the terms trustworthiness versus validity when employing qualitative research methods (e.g., Lincoln & Guba, 2000), the notion of validity is intentionally used here to indicate a verification process that supports rigour throughout both phases of this MMR study. Morse et al. (2002) have noted that “[w]hether quantitative or qualitative methods are used, rigor is a desired goal that is met through specific verification

strategies. While different strategies are used for each paradigm, the term validity is the most pertinent term for these processes” (p. 14). As such, verification strategies that supported validity and rigour were appropriate for both phases of this MMR study.

Following Cohen et al.’s (2011) recommendations, I have used qualitative verification principles throughout the first phase of the study, ensuring the following:

- Context-boundedness and thick description;
- The data is descriptive;
- There is concern for processes rather than simply with outcomes;
- Respondent validation is important;
- Catching meaning and intention are essential. (p. 180)

Attention was given to the sampling techniques employed for both MMR phases, and attention was paid to these strategies when developing the interview guide, testing reliable survey questioning techniques for identified variables within the survey design via the two pilot phases, and in application of measures and statistical analysis used (Cohen et al., 2011). In addition to these verification strategies, personal research notes, review, and consultation with research peers, supplemented by an audit trail, are measures taken and integrated to support rigour (Mayan, 2009, pp. 111-112). The researcher also conducted member checks with interview participants regarding the findings presented in this study. Furthermore, the literature review, multiple pilots of the survey instrument, and statistical testing were used to determine validity and reliability, with good values for Cronbach’s alpha over 0.8 confirmed for scale reliability (Field, 2006; Coolidge & Segal, 2004).

Although the interviews were semi-structured and the survey contained many closed-items, several open-ended items were included in both the interviews and the survey, so that

evidence regarding other themes and patterns could emerge from the data. Such open-ended questions added to validity since “the use of transposed textual descriptive responses, now covers the topic more comprehensively” (Morse & Niehaus, 2009, p. 128). Furthermore, *memoing techniques* have been used as a step between data collection and written analysis, whereby memo-writing helps the researcher to construct analytic notes throughout the research process (Charmaz, 2014, p. 163). To preserve accuracy, quality, and reflexivity I have written notes throughout the data collection process (Charmaz, 2014), capturing elements such as the schedule, setting, and other research details (Mayan, 2009, p. 78).

Summary

This chapter has explained the research methodology and associated methods, including the qualitative and quantitative research approaches that have guided the study. Generic qualitative research strategies drawing on CGT techniques informed the first component of the MMR design, with the aim of demonstrating how this research strategy brings value for new insights into the research questions at hand. The survey was comprised of a cross-sectional design administered via online distribution. The specific qualitative and quantitative methods that informed data collection and analysis are detailed, as well as considerations supporting rigour. This research design has provided a solid foundation to investigate student perceptions of meaning making and SMTs in their learning.

Chapter 4

Qualitative Results

This chapter presents the findings from 30 intensive, semi-structured interviews conducted with full-time undergraduate students across disciplines, with ten participants from each disciplinary area of the humanities and social sciences, the health sciences, and the natural sciences and engineering. Specifically, this data collection and analysis focused on answering the research questions guiding this study: (*RQ1*) in what ways do undergraduate learners from different disciplines view social media to be a meaningful part of their university learning? And, (*RQ2*) what characteristics of social media do undergraduate learners see as contributing to their meaning making during their university learning?

Aligned with overarching MMR and social constructivist approaches, data were analyzed using generic qualitative (Merriam, 2009) and CGT (Charmaz, 2014) techniques, including relevant memoing, constant comparison, and qualitative (e.g., initial, incident-with-incident, and focused) coding methods. To ensure rigour, great attention has been given to context-boundedness, thick description, concern for process not simply outcomes, and member checks (Cohen et al., 2011), with an overall attentiveness to the meaning of phenomena investigated.

Undergraduate students who participated in the interviews for this study articulated many intentional and meaningful ways of using social media in their learning. With few exceptions, the majority of students interviewed indicated use of social media in their own university learning, with overarching themes emerging within disciplines regarding the reasons informing these social media choices. Pseudonyms have been used to protect the identities of all interview participants, and a summary of participant characteristics can be found in Appendix C.

“A Real Double-Edged Sword:” Student Perspectives of Social Media

Throughout the interviews, students spoke of balancing a tension between the aspects of social media that are helpful and beneficial in their learning, and those that hinder and are of concern. Across disciplines, students described this tension as a “real double-edged sword” with which they grapple when making choices about social media in their own university learning:

...there’s a lot of misinformation. So it’s, it can be a really, a real double-edge sword so it’s, it’s gonna be important for students if they do want to use social media um, to know what’s important. And maybe that’d be a good skill to teach students, too.

– Greg, fourth year student, Faculty of Arts

Geoffrey, a third year Arts student, also described SMTs use as a double-edged sword having the potential “to both inform and to um uh to distract.” For the majority of students interviewed, while they underscored this two-sidedness of social media as having the potential to both inform and distract, in their view the pros of social media for their learning often outweighed the cons. Even while articulating the benefits of social media for their learning, students described certain aspects of social media as having the potential to hinder their learning, noting several concerns (e.g., distraction, privacy, etc.) of which they are continually cognizant. Results of the interviews revealed several core categories of helping and hindering comprising this double-edged sword, as outlined in Table 4.1 below.

Table 4.1

Social Media as a Double-Edged Sword: Helping and Hindering Categories

Helping	Hindering
<ul style="list-style-type: none"> • Time and Organization • Communicating and Connecting • Keeping Up-to-Date • Information and Help Seeking • Sharing and Application • Building Understanding 	<ul style="list-style-type: none"> • Distraction and Focus • Preference to Learn Other Ways • Lack of Credibility • Privacy and Anonymity

Helping Categories

Students noted that, when “using it for the right purposes” social media helps because it can “definitely get things done a lot quicker and save you a lot of time,” and aids in organization. Students indicated that one of the main reasons they use social media in their learning is because it is convenient, accessible, and easy to use and learn. For many, social media was something comfortable and familiar, and that they already used in their daily lives.

Time and Organization

In terms of managing their schedules, there are often particular uses for sharable calendars, as third year student Kim in the Faculty of Medicine and Dentistry noted for clinicals: “at the beginning of the year, our course coordinator sends out um a file and we upload it onto Google Calendar so we know where we’re going.” Student use of sharable Google Calendars supplied by course coordinators was specifically noted within the health sciences (e.g., in their rotations), whereas those from other disciplines did not articulate receiving or using sharable calendars, instead indicating a number of different ways to manage their schedules. For example, students also mentioned print day-timers or mobile calendars on cell phones for managing their course schedules, exam dates, and other deadlines.

Across disciplines, students noted how social media helped in overcoming issues of transportation and “conflicting schedules” that can occur when trying to work with others. These students valued the “freedom” and flexibility of doing things “on your own time,” from anywhere, as a way of effectively and efficiently managing competing demands on their time. Related to these efficiencies, students noted that they use social media “definitely to organize information.” Examples include managing and storing files, such as class notes and readings, for individual use (i.e., to access from different locations) or to share with their peers.

Though students overall indicated organizing and storing information in a variety of individual and shared ways, in terms of accessibility and accommodation options, it is important to note that there was a strong emphasis on individual use. For instance, in reference to disability services, one student described the use of media and recording technologies to manage information in different accommodation formats (e.g., audio-visual capture of lectures). In this context, the student emphasized specific restrictions on sharing, noting that these media (the, lecture recordings) must be utilized individually and kept private as a condition of their creation and use.

Communicating and Connecting

Students also described social media as a way to communicate with others and “to stay connected with people around me.” Contacting and interacting with others often involved being in touch with other students in a course or cohort, but also involved interacting with people at other universities. For example, first year Nursing student Jessica indicated using Facebook “for connecting and collaborating with um the students who are in my group, so with my peers and my colleagues.” For group projects and collaboration, SMTs (and Facebook in particular) were frequently mentioned; for instance, in communicating and collaborating on group assignments (e.g., about meeting in person or online, for completing and managing tasks, etc.). Other communicating and connecting aspects included studying with peers (e.g., synchronously), and having the ability to discuss topics and connect with other students who were knowledgeable about these ideas and interests. As third-year Arts student Joseph described, social media could “speed up interactions and create new interactions that wouldn’t be possible otherwise. I think that’s beneficial to learning...” In this way, social media is demonstrably useful for

communicating and connecting, particularly for student-student educational interactions (Anderson, 2008).

Staying connected via social media was a means of making new friends or contacts and creating or expanding social or professional networks. Some students described feeling isolated or disconnected from others on a large university campus. Ian, a second year Physical Education student, described using social media for personal connections: “Especially on a campus of 70,000 where you don’t feel super connected to everyone around you...[social media is] a good way to connect with everyone.” Students described staying connected with each other and with their academic and professional contacts, often viewing social media as “a networking tool.” Communicating and connecting via social media also helped in “getting the word across...[to] get people involved” in what was happening within and beyond the university.

For students, while getting the word across can mean communicating about events (as discussed below), it can also involve applying learning for the public good. Due to the ability of some social media to reach a wide, public audience, several students mentioned its helpfulness to “reach more people” and “spread awareness” as they applied and translated their learning through advocacy and public engagement. Richard, a first year Science student, illustrated using social media “for the awareness of education” when following public intellectuals who had a large presence on social media, giving the example of astrophysicist and science communicator Neil deGrasse Tyson: “people like that, like the communicators, the experts that go out of their way to communicate the field to the masses and stuff. That’s very important I think.” Across disciplines, students provided similar examples of using social media for promotion and awareness related to their learning. Other examples include a student from the Faculty of Medicine and Dentistry interested in promoting oral health, and a student from the Faculty of

Arts spreading awareness about “injustice” and international issues, such as riots occurring in Ukraine.

Communicating and connecting for advocacy can involve students applying what they have learned in university to engage others in topics of interest. This includes using their learning to communicate accurate and rigorous knowledge, by the “challenging of false information” available to a mass audience. For example, several health sciences students noted problems of misinformation related to health issues, such as vaccinations. Nursing student Jessica mentioned that that while it is problematic to encounter false information online, it is “good too though in a sense ‘cause then you get to know what people are thinking and what misconceptions are out there.” The double-edged sword of social media involves encountering false information, but also challenging common misconceptions and false information communicated in shared spaces.

Keeping Up-to-Date

Overall, students also noted that social media helped them to “keep up with everything.” A frequent reason students gave regarding the helping aspect of social media was the ability to plan and “promote our events,” such as those organized within university groups, clubs, and societies. One student described the importance of seeing and promoting events on Facebook:

Um, if, I feel like if we just focus too much in the academic thing, you, you miss out on quite a bit of the social that we could have together.... I know there’s one [event] coming up right now that we’re planning...to be going out together and just having a little bit of fun.... So you know there’s all kinds of stuff like that going on that’s just kind of, takes you away from the school ‘cause it’s just so much.

– Justin, third year student, Faculty of Medicine and Dentistry

Justin's description illustrates how social media is also used to create awareness about academic and non-academic events, including social activities where students can de-stress and have fun. By staying up-to-date via social media, students are aware of activities and events happening within and beyond the university. This also includes knowing about volunteer opportunities, fundraisers and other events of interest. Jessica, a first year student in Nursing, described using social media for "keeping aware of events and opportunities, because it is c- it is really hard to find opportunities and come across them. So social media, especially Facebook, really helps with that." Students described social media as "a good source of news," to stay informed about and be alerted to current events.

According to students, keeping up-to-date and creating awareness of current events included following a variety of diverse topics, from political issues to disasters to diseases. Social media (such as Facebook) could be used for alerts on news and events, and many students indicated they "check it often." Kim, a third year student in the Faculty of Medicine and Dentistry, noted that "staying updated on things" also meant staying current with new developments and research in her professional field, both now and in the future: "it keeps me updated, which is quite important in our profession." Other students, and particularly those in professionalized areas, indicated similar professional needs for keeping up-to-date:

But if you need to understand how it's really gonna help a patient, it's good to, like actually the patient cases which we'll post, or like examples of the news...So it's, it's, like actually using real life events to what you learn in school.

– Danielle, second year student, Faculty of Pharmacy and Pharmaceutical Sciences

Here, social media is important for its role in using examples from the news and for "using real life events" and cases for learning. While most students indicated using social media for news

and events generally, several students in the health sciences gave similar examples for using social media as a way to keep up-to-date with events and real life cases that specifically applied to their studies.

Information and Help Seeking

Social media plays an important role enhancing learning through information and help seeking. Information can be found, gathered, and shared via social media platforms, and students described the value of having a forum (especially Facebook) for seeking answers to their questions. As Joseph, a third year Arts student in a cohort-based program, stated: “basically, you get the privilege of asking your question to a specific set of people that you know have probably the same questions.” Indeed, students spoke about the benefit of having a go-to place for resources and information, and in particular, students who had an online community via Facebook saw value in being able to gather and discuss information with those who know the context of what was being learned. Across disciplines, sites such as Wikipedia and YouTube were often mentioned for building understanding (as discussed below). Particularly within cohort-learning, and these go-to places for finding information within a student community (often Facebook) was one of the most frequently mentioned reasons for using SMTs. As one student described, even when professors used other social media, students who used Facebook as a go-to forum would gather and transfer this information:

Um one of our classes, actually, the teacher uses Twitter to try and communicate assignments with us. But not- not most of us have Twitter or bother following it, so some of the- the individuals that do just transfer that information to Facebook for us.... people will pass on information that they find out, like if somebody finds out more information

that they think was unclear, they'll just post it on Facebook and be like "Hey guys, like this is actually what's going on," um and "this is how you figure it out."

– Deborah, first year student, Faculty of Medicine and Dentistry

More than finding and transferring information, many students viewed student communities on Facebook as "something that supports you" both personally and academically. Deborah described these academic and social aspects as important for getting "to know how human my classmates are as well, too, that we don't have to keep up this, you know, face. [Chuckles]." As a result, the academic and personal help seeking aspect of social media involves academic as well as social support.

Particularly in cohort-learning programs, students articulated how their Facebook communities would serve as a form of support. Danielle, a second year student in the Faculty of Pharmacy and Pharmaceutical Sciences, described it as follows: "It's really a way that people get to help each other, and ask for help, and get support." Especially in the context of cohort-learning, social media helps to create "a social help network" for more than just assignments:

...it's not just all assignments and stuff like that. We do just talk, and uh, on Facebook sometimes, and you just see the friendliness...if something bad happens with someone for example, you know there's other people there just kind of lift you up, and put you back up on your feet.

– Justin, third year student, Faculty of Medicine and Dentistry

Using SMTs (e.g., Facebook) as an information forum and help network aids students not only in finding resources and accessing information, such as readings and class notes, but also in connecting to the day-to-day challenges students face in their personal and academic lives. First year health sciences student Deborah discussed the day-to-day support with her cohort on

Facebook, describing an experience that “emotionally is satisfying.” In the context cohort-learning programs, information and help seeking involves using social media, most frequently Facebook, for intellectual and emotional support in students’ day-to-day lives.

Finally, in regard to information and help seeking, students noted that they often made social media choices based on what they believed would be most beneficial and helpful for their own learning style(s). Several students spoke of being a visual learner and needing to draw or see the concepts they were learning. For example, Brad spoke of the benefits of YouTube for his learning style:

...they’re [YouTube presenters’] use of, a little bit simpler words, and it actually, and there’s a lot of pictures...I’m kinda like a hands on guy too, so I need to do something while I’m actually doing, so. I have a white board at home and I actually like draw on it as I go along....so to me that’s kind of how it works, that’s my learning process...

– Brad, first year student, Faculty of Science

Several students, like Brad, described using social media such as YouTube to visualize information as related to how they understand their own learning processes. Many students noted using social media to help find and access concise and clear descriptions that could be replayed, as well as having explanations available in a different (i.e., visual, auditory, etc.) medium.

Sharing and Application

Throughout the interviews, students explained why and how social media helped them share and apply ideas and information in context. Across disciplines, students described social media as a way to help see different perspectives and interpretations, and to consider issues in different ways. Anne, a first year Arts student, described using blogs for this purpose: “I mostly use them for English and Sociology ‘cause those- you need- it’s good to get different

perspectives and opinions on things.” Danielle, a second year Pharmacy and Pharmaceutical Sciences student, provided a similar example: “it’s helps you to look at so many different perspectives and resources that it’s really helpful...like if they look at an issue a different way than you did.” Sharing via social media enabled students to make sense of their learning by seeing other interpretations, opinions, and perspectives. Another health sciences student described how sharing via comments on social media helped her to make sense of her learning:

But it helps, I guess, in me getting to see other perspectives...you know when you read comments, right? A lot of people have different opinions and different things they wanna say and so even if I don’t agree with them, I still consider what they’re saying and where they’re coming from. So that helps me make sense of my knowledge I would say.

– Jessica, first year student, Faculty of Nursing

As a part of seeing different perspectives, sharing via social media also provided a “broader sense of ideas,” as second year Arts student Hillary stated. For example, via social sharing, students can see broader cultural contexts that help in applying learning. Kyle, a second year student in the Faculty of Engineering, described how sharing Russian YouTube videos (e.g., movies, popular music videos, etc.) helped with his Russian language class because “it gives the course a cultural sense.” Similarly, first year Science student Richard referred to the power of social media as a “cultural catalyst” in providing a broader context for his writing: “it allows me to critique my own work better because I have a broader vision of the work that’s out there.”

When describing social media as a cultural catalyst, Richard continued to expose the theme of the double-edged sword articulated by other students, emphasizing the double-edged nature of social media in promoting beneficial as well as undesirable aspects of culture. Similarly, Arts

student Joseph used the word “catalyst” in describing a valuable process of critique, with the goal of broadening knowledge and coming up with new ideas:

Um, well in my specific area of study, collaboration is a pretty big catalyst in the process of learning and coming up with new ideas because, ‘cause you kinda need peers to tell you, “Oh you- this- you’re just wrong,” or something like that.

– Joseph, third year student, Faculty of Arts

When students described social media as catalyzing culture, they underscored the educational importance of being able to think rigorously and critically, from many broad angles, about the value and meaning of what was being shared.

Students, particularly those in cohort-learning programs, also spoke about broadening and extending their learning via social media by seeing broader applications in professional and career contexts. Regarding his use of sites such as Facebook and Pinterest, third year Arts student Joseph described using social media for “extending my personal learning and maybe like informing a career path.” Several students noted that professional organizations in their field had a social media presence, such as Facebook pages. For professional applications and beyond, students described social media as a way to apply their knowledge and skills, and to extend what they are learning and doing beyond university. As an example:

I was able to apply it...it makes um, the learning more, like realistic and meaningful because it’s part of your everyday life then, like YouTube, Facebook um, reading funny new sites etcetera, being able to contribute using your degree...I found it more meaningfully yeah, ‘cause it’s more realistic like, I was able to do something more...

– Greg, fourth year student, Faculty of Arts

From the students' viewpoints, sharing and application via social media helped in looking at issues in different ways, in seeing a diverse range of perspectives and opinions, and in applying their knowledge and skills in meaningful and realistic ways.

Building Understanding

Undergraduates also described how social media helps them in building their understanding of topics and concepts. According to students, social media (commonly Facebook, Wikipedia, and YouTube) is often used as a starting place to help in clarifying content, as well as being able to repeatedly revisit and review material (e.g., definitions, equations, animations, etc.) that is broken down clearly and concisely. George, a second year Science student, described using social media for the following reasons: "trying to just understand the basic idea behind something.... To help you get started on your own path...it's definitely a stepping stone, for sure." Other students described using social media as a "stepping stone" or a starting point:

Like if I have no idea how to start a Bio lab report, I'll Wiki like what we're doing, and then I'll find the references and I'll be like okay, here's step one. [Laughs] Find out what you're doing. Right? So it's like good for starting points and things.

– Dorothy, first year student, Faculty of Science

In describing how social media helped in building their understanding, students often likened social media to a wayfinding activity, as a way of making sense of and navigating their way through problems.

In terms of wayfinding and problem-solving, students in the Humanities and Social Sciences and the Natural Sciences and Engineering areas mentioned using social media as a starting place, for gaining a sense of direction. For example, third year Arts student Joseph viewed social media as a "really good way to just like point someone in a direction to something

else online that you're looking at in order to build a shared experience." Anne, a first year Arts student, also described finding perspectives via social media as a wayfinding activity: "if I find something I really like, I try to like do academic journals and stuff but like it's good for like getting a sense of direction." And David, a first year student in the Faculty of Engineering, stated that he used social media "to better understand... what my dilemma is right now." In all of these examples, the common purpose of using social media was to make sense of their learning, to find a way to further individual or shared understanding, and to determine the direction of their learning journey.

Additionally, social media helped students in building understanding by providing another way of displaying and explaining information. For example, students from different disciplines described the value of being able to visualize and replay explanations of the concepts they were learning. Many students described examples where social media, such as YouTube, "helps me visualize" concepts. First year Science student Jennifer stated the following about YouTube: "It's just easier to learn it that way 'cause then you can like actually see what they're doing." Brad, also a first year Science student, gave a similar description: "seeing everything and putting to motion, and then from there I take it on, that's it." Students in the health sciences also described the value of being able to see procedures, techniques, and other parts of their learning on YouTube:

I do use YouTube quite a bit for academic purposes. You know, like watching Khan Academy videos and whatnot, especially for Physiology and Anatomy it's really, really helpful. There's actually quite a lot on nursing topics as well. So we use YouTube quite a bit. Or even um like reviewing first-aid I'll go to [Chuckles] YouTube just to, 'cause I'm- I'm a really visual person so YouTube's great.

– Jessica, first year student, Faculty of Nursing

In building their understanding, social media helped as a starting place when trying to make sense of learning. Students described different wayfinding purposes of social media, such as using Wikipedia and Facebook, for beginning their learning process. Furthermore, students across disciplines described why they value having visual resources, such as YouTube, to see and replay concepts that are put into motion.

Hindering Categories

Students commonly indicated that social media hinders when it distracts and takes their focus away from learning. Sarah, a third year Arts student, described how distraction on social media hindered her learning in the following way: “it can be kind of distracting, wanting to like post all the time instead of study” or paying attention to the work at hand. Although digital native proponents have claimed these students are multitaskers, first year Arts student Anne indicated problems with multitasking related to distraction: “I tend to like to multitask and although it makes it like seem to go by faster, it really doesn’t help very much. It um deters from learning.”

Distraction and Focus

Students often mentioned that social media becomes problematic when it takes time and focus away from learning. For this reason, several students, such as Erin, a second year Arts student, tried to limit their academic use of social media: “academically, I try to stay away from that um because it’ll just take time away from me having to do something for school.” Students frequently mentioned how social media promoted procrastination, taking away from their learning:

It is, ‘cause those things they like to bring in a whole bunch of ideas, and put it all on one page. That what makes it so attractive, but at the same time it’s also kinda dangerous too

‘cause versus a textbook, a textbook like say a chemistry textbook. You’re just there and you’re reading it, you’re completely focused, it’s not gonna be a cat video or anything. But say if I decide to bring out like my iPad or something... it’s a potential to be completely distracting.

– George, first year student, Faculty of Science

Here again, George described social media as a double-edged sword that is both attractive and dangerous because there is the potential to both inform and distract. George’s example of having a focused experience with a textbook versus an iPad, where forms of entertainment can distract one’s focus, is a vivid picture of how social media can interrupt and interfere with learning.

Another potentially dangerous aspect of social media that takes away from learning is addiction to social media. Though not frequently mentioned in the interviews, a few students described aspects of social media as addictive. For example, one student described using social media, specifically games, as “really addicting,” reflecting that they could have put that time to better use. Another student characterized social media as related to “adjunctive behaviours,” and stated that he would “binge and purge” on social media distractions. To manage distractions, first year Nursing student Mina described deleting her Facebook account and installing a browser extension disabling social media and other technological distractions during certain times of the day. However, for those students where academic and social communities (particularly in cohort-learning programs, such as Nursing) are a large part of their learning experience, it can be difficult to avoid social media. As Mina described, “we use Facebook, it’s so much a part of like school, and socializing that you cannot not have it.” For those facing severe distractions via social media, the necessity to use these technologies can be problematic.

In discussing the potential to distract from learning, several students noted that social media mainly prevents focus when the purpose of the platform is not for learning. For example, several students referred to the “limitations” of some social media sites, while others discuss the vastness of social media. Students noted that the 140 character limit in Twitter, the six-second time limit in Vine, and the image-based tools on Instagram and Pinterest, as examples of SMTs with limitations that may not be suited to learning generally or to certain subjects or disciplines specifically. An emphasis on understanding the purpose and intention of using social media often came up during discussions of distraction. Third year Arts student Sarah provided this description: “a lot of the social media I guess isn’t really geared towards learning.” Likewise, first year Science student Richard noted the difficulty of trying to “post a picture of Pi and people are gonna be like ‘oh my god,’ you have to explain to the people who don’t understand.” Oftentimes, student descriptions of what they considered useful and helpful for learning versus what they found detrimental or hindering for learning related to their own learning contexts, their own levels of understanding and comfort with the subject or technology in question, and the learning issue they sought to address. Therefore, metacognitive awareness of how one learns best, as well as self-regulated learning skills that help manage distractions and procrastination, become key.

Preference to Learn Other Ways

Another core recurring theme discovered during the interviews was a preference to learn in other ways *not* provided via social media. In terms of hindering their learning, students described making an intentional decision not to use social media when they saw greater benefits in other ways of learning, such as face-to-face experiences or using traditional resources (e.g., print books, day timers, etc.). Some students spoke about the negative aspects of always being on

their devices and having to check things via many different technologies. Indeed, rather than looking solely to technology for their learning, students often articulated the value of having a combination of face-to-face and online experiences in their learning.

Across disciplines, students noted several reasons for viewing face-to-face learning experiences as important. For example, fourth year Pharmacy and Pharmaceutical Sciences student Caroline expressed the ease of communicating with peers over Facebook, but while she noted some usefulness to social media, overall she concluded that there is still a key role for face-to-face learning: “I think in person is the best way to be, really.” Others articulated similar points, noting that while communication online can be quick and convenient, oftentimes there is a preference for face-to-face learning as a way to “get your points across much easier.” At times, students described going back and forth between social media and face-to-face learning, as a way to follow-up or continue collaboration. For instance, first year student Anne in the Faculty of Arts described the following: “I think the closer I am with the person the more easily I can use Facebook and things like that ‘cause like I- I already understand them and how they think.” Likewise, Science student Jane stated that face-to-face meetings are helpful for getting “to know that person way better, especially like for groups.” In this way, many students believed face-to-face communication allows for better understanding via nuance, emotion, and body language:

I would prefer face-to-face, just ‘cause then I can understand. It’s easier to read people when you’re sitting across from them versus over the Internet ‘cause they could say one thing and there’s no sarcastic font and there’s no like hand gestures or like eye contact...

– Dorothy, a first year student, Faculty of Science

Related to these points about the value of being able to “read people” in person, several students noted that miscommunication or conflict occurs more easily online. As first year Nursing student

Mina noted, when losing “the emotional context” online, miscommunication or even avoiding communication altogether can become an issue.

Other students noted that online conversations via SMTs such as Facebook promoted a lack of communication that is problematic or difficult to gauge. As third year Arts student Joseph stated, “there’s no ‘Dislike’ button on Facebook. You know, so what do you do if you disagree? You just ignore people.” Gauging understanding of complex issues through face-to-face questioning or disagreement was likened to a way of “more active learning”:

...definitely if you’re face-to-face it’s more active learning I think ‘cause you can ask more questions, um the Prof or the Instructor would kind of know from everyone’s reaction how well you understand the information, whereas online um people just kind of like, they could just read it and just kind of throw it away right after.

– Jane, second year student, Faculty of Science

Several students described avoiding or having trouble communicating about complex issues via social media, especially when there may be disagreement or conflict.

Another recurring theme across disciplines related to student preferences to learn individually and the individual use of social media. Some students indicated having a preference for working on their own, and the ability to turn off social media and study on their own. For example, second year Pharmacy and Pharmaceutical Sciences student Danielle stated “I hate group projects [Laughs] I like working by myself.” As another student described, aside from using Google Docs for group collaboration, she prefers using SMTs individually:

So, I use more of, I guess you would say the social media that’s individually accessed and individually experienced, besides Google Docs. But even then, Google Docs I find can be a bit frustrating as well, especially when people are like editing what you wrote and it

turns out to be something you didn't mean to write and then there's that whole miscommunication as well. So with group collaborating, sometimes it can be useful, but it results in a lot of miscommunication. Whereas the other ones that you would individually use and just not be interacting with other people, is more useful and productive and definitely um worth my time, I would say.

– Jessica, first year student, Faculty of Nursing

Other students also noted that, while they do use SMTs for working in groups, they most often chose to use them individually. As a result, students articulated using SMTs not only for student-student educational interactions, but also for student-content interactions (see Anderson, 2008; Moore, 1989). In addition to using social media for student-student interactions, this core theme of student-content interactions emerged from student interviews, such as when describing the use of YouTube to view concepts, and to clarify and build one's own knowledge as an "independent learner," rather than to interact with others.

Lack of Credibility

Another common concern regarding social media was the potential lack of credible information shared. When asked about the conclusions she had come to regarding the things she found on social media for learning, third year Nursing student Alice stated "that they're not credible" or worthwhile. Acknowledging that there can be both "good" and "bad" information on social media, many students echoed this concern over "false information" as being potentially detrimental to learning:

...they're detrimental yeah, really the misinformation because you- you have to be able to critically appraise sources, and you have to be confident doing that...use good searching techniques, and um, different uh, strategies to determine if a page is legitimate, you know

based on credibility, the author um, recency of the article [etc.]... Those are all really important things, and so it's gonna be important for students to learn that...

– Greg, fourth year student, Faculty of Arts

Concerns over misinformation or a lack of credibility, and having strong critical appraisal and information literacy skills when using social media, are things that many students viewed as being important for their learning.

Related to credibility is the notion of placing focus on meaningful, high quality information and interactions, particularly when using social media for learning. Conversely, some students described specific SMTs as detrimental when they consider the interactions to be distracting or of low quality:

Like if the, if the main focus of the technology isn't for learning, I don't think it's gonna be necessarily useful for learning. Uh, a lot of them [on social media] I don't interact with the people on there, 'cause you see a lot of BS I guess on things like Instagram, Vine, Twitter, Facebook. And you don't really need to see that when you're trying to learn. And those would be the two main reasons I wouldn't use it just, I- I'm not a fan of the interactions you have and it's really a distraction.

– Ian, second year student, Faculty of Physical Education

Here again, the double-edged sword came to the fore, with students placing emphasis on using social media “properly” to determine if information and interactions are helping or hindering learning. First year Science student Richard described having an “insanely love-hate” relationship with Instagram, benefiting from sharing his creative writing but also cringing when seeing the popular page, and noting that as with any technology social media “just needs to be used properly.” Several examples illustrated the importance of engaging critically with SMTs.

When it comes to credibility and using information “properly,” as Greg noted, digital literacies and critical appraisal skills can be invaluable. Additionally, one’s ability to properly navigate the “BS” on social media requires critical knowledge and skills for understanding the nature of the interactions happening. To this end, educating and developing understanding on wider digital literacies can help to support this need, since students themselves express the importance of understanding whether and how certain SMTs are (or are not) focused for learning.

Privacy and Anonymity

Several students expressed their concerns regarding privacy and anonymity when using social media. In general, students indicated the importance of maintaining their privacy, with some students associating social media with a lack of privacy. As first year Science student Dorothy stated, “I do like having a lot of privacy.” Students outlined several reasons why privacy is important. For instance, because social media can be easily shared, it can increase the chance of being embarrassed by mistakes, as third year Engineering student David described: “because [in person] it’s more private I think, I think it’s easier to- to s- to speak uh face-to-face. Um there’s less chance for you to be embarrassed if you, you know, get something wrong.”

Students also discussed wanting to have some degree of control over the kinds of information shared, and wanted anonymity options as one way to protect privacy. For example, one student described being asked by the instructor to access another third-party site for assessments (e.g., quizzes). While the instructor provided instructions on potential ways for students to stay anonymous “‘cause people were so worried about um their information being out,” second year Science student Jane described also seeing an option to sign in with a

Facebook login, and purposely choosing not to associate her Facebook account with her assignments because “I just, I didn’t want that information there.”

Regarding concerns about anonymity, not only did students want options to stay anonymous in certain venues to protect their privacy, but also several students noted anonymity concerns regarding social media interactions that can be “faceless” where “people like to hide behind a screen.” While acknowledging the importance of privacy, at the same time, students articulated negative aspects of faceless interactions, particularly when there may be other concerns over potentially inappropriate activity, including not knowing how to address unprofessional conduct, bullying, hate crimes, cheating, or plagiarism:

Um, I mean maybe like if there’s bullying going on something, and like there’s no authority figure for it, then like what do you do then, right? Or like if there’s cheating going on, or plagiarism, and you know about it, it’s on Facebook but it’s private like, who sees it? Right? And like what do you do then? There’s not really a guideline for that.

– Mina, first year student, Faculty of Nursing

To address privacy concerns, several students noted that they endeavour to maintain high security settings to avoid unwanted access and interactions. Students also viewed certain SMTs as being more private and enabling more personal control over what might be accessed, such as Facebook having more security and privacy settings than Twitter. Second year Arts student Hillary stated that “anyone can see something on social media, unless there’s privacy settings.”

Discussion of privacy settings, such as those that can be set in Facebook, often occurred during conversations regarding privacy. A health sciences student noted that she valued sharing and having a community of other students, and her description indicated that she believes settings can be used to keep Facebook private:

... is that it's nice that we can do it in private, like on Facebook that they have that option. But sometimes I've heard of people who do it not private, and then people do like look it up, and then you get caught or something, for something like posting a picture, like I know somebody went to clinicals and like posted a selfie and they were in the clinical, and you're not allowed to do that...they found out because it was on public, like it wasn't private. So stuff like that, like you shouldn't be doing... Yeah so that's where I think the line gets kind of like weird, so I would definitely keep those separate for sure. Like I wouldn't ever mix it, yeah. [Laughs]

– Mina, first year student, Faculty of Nursing

Here, there is a tension in crossing a line between sharing with colleagues and classmates and following rules that protect privacy, in this case in a clinical setting. Several students, particularly those from health sciences disciplines where cohort-learning is common, described how they valued posting profession-related memes or comments about their schedules in Facebook as a way to share and support their day-to-day experiences. Yet at the same time, these students often described not being “allowed” to use social media in their professional, disciplinary contexts.

One student described a type of “disclaimer” appearing on one of the students’ social Facebook groups: “the acronym stands for U of A Med, but it’s something like Unintended Aspirations and the disclaimer says ‘Nothing to do with Medicine.’” In such examples, using privacy settings and having such disclaimers were seen as ways to mitigate privacy risks, although there was little discussion of problems or limitations with these approaches. Students acknowledged that, especially for reasons of professionalism, the privacy of others has to be respected. A health sciences student described these issues as follows:

...they [the university] don't want us using social media to discuss anything related to clinical, anything related to patient, anything related to um, like even your experience at clinical sites, or just about the Faculty, or you know? Um, but we do [Laughs]...there's no like patient information, or patients like in the background, it's just the students.

– Mary, third year student, Faculty of Nursing

Mary knows that university officials warns students against such posting, but indicated that students continue to do so while aiming to maintain privacy and professionalism standards, though she also mentioned that it is “forbidden” and she was not sure that the Faculty knows about these Facebook groups. Another student in Nursing also defended sharing in these Facebook groups because “they're not doing it in an inappropriate way. And it's kept private.” Using settings in Facebook to keep things “private” and not openly viewable, as well as trying to ensure no inappropriate information would be captured or shared and putting in a disclaimer, were all viewed as ways to balance these students' need for privacy and professionalism with their need for sharing and connecting with peers.

Helping and Hindering: Context is Key

Knowing whether social media helps or hinders often depends on the nature of the interaction, on the characteristics of specific SMTs and what they afford, and on the context of what is being learned. When asked whether certain social media help or hinder learning, second year Arts student Hillary summed up this point well: “depends on what you're learning, right?”

Managing the Double-Edged Sword: Separating Academic and Social Spheres

In order to manage the helping-and-hindering double-edged sword, students often described intentionally separating academic and social spheres of their social media lives. As first year Nursing student Mina's comments about public versus private social media presence

demonstrate, students often also see a line between the social and academic. These descriptions detail the many ways in which social and academic interactions can overlap via social media.

Determining the Dividing Line

Many students articulated clear reasons for ultimately drawing a line to separate certain academic and social uses of social media, ranging from managing distraction to maintaining privacy and professionalism to organization. For example, first year Arts student Anne stated “I also think it’s good to separate social and academic.... It’s just easier to separate them, to be more organized and um it’s also like less distracting...” In terms of organization, separation can range from using folders (e.g., in Google Drive) and settings to creating completely separate accounts. Although many students interviewed indicated using social media for learning, a few students described managing distraction by not using particular SMTs at all for learning, thereby completely separating academic and social spheres in intentional ways. For example, second year Science student George described using Wikipedia for school, but keeping Facebook and Twitter separate: “I know it exists but personally I don’t like to use social media with my educa- I like to keep it separate, for me it’s more distracting rather than a helpful situation.”

To manage the line between personal and professional use of social media, several students indicated that they would create a separate accounts or group settings (e.g., in Facebook) to ensure professionalism and privacy between their personal lives and their volunteer, work, or academic activities. Third year Arts student Joseph, who indicated extensive use of Facebook for a variety of social and academic purposes in his cohort-learning program, described keeping personal (e.g., girlfriend) and university spaces separate: “They’re definitely very exclusive, fairly separate for me.” Third year student Kim in the Faculty of Medicine and Dentistry noted that she has three separate Facebook groups for communicating with her own

cohort as well as those junior and senior to her year: “They’re [the Facebook groups are] separate. So it’d be three [Facebook groups] ‘cause we would communicate with our seniors, and then one [Facebook group] with the juniors, and then one [Facebook group] with ourselves. [Chuckles].” First year student Deborah in the Faculty of Medicine and Dentistry also described how students in previous cohort years had set up a Facebook group for her cohort year, to help “survive” the first year transition in their program: “I think it’s partly because the previous year set it up to be that way...and partly just a need to survive.” As such, students in cohort-learning programs indicated using Facebook groups as a way to separate and combine different kinds of student-student interactions, both within and across a class, a program, or different cohort years.

Regarding distraction, in terms of separation, students also viewed certain SMTs as more suited to academic versus social purposes. For example, Google Drive is understood to be a common university-supported platform for students, often as a temporary forum for collaboration, whereas other SMTs (e.g., Facebook) are commonly seen to be for lasting connections. As second year Arts student Erin described: “...Google Docs is that temporary uh forum that we needed and Facebook is a bit...more extensive.” Some students, particularly those *not* within cohort-learning programs, articulated discomfort with using Facebook for university. In this way, SMTs such as the institutionally supported Google Apps platform can be used for academic collaboration in a way that is more targeted and temporary, and also separate from more ubiquitous, personal SMTs, such as Facebook.

Boundaries Between Faculty and Students

In separating certain social and academic uses of social media, students often indicated that there is a line or boundary to be respected between student and faculty. Indeed, many students indicated that it would be uncomfortable to interact with faculty on social media. As

second year Science student George stated, “for me it would be awkward” to see the personal aspects of a faculty member’s life. Jennifer, also a Science student, echoed a similar example related to her life: “I would still feel a little bit weird if my Prof was like, ‘I’m gonna follow you on Instagram,’ ‘cause I’d be like that’s awkward, like those are my pictures and my life.” Several students described drawing a line or boundary separating interactions between faculty and their current students on social media:

I think there’s that professional boundary that you should kind of have as a student and a professor. And our professors even tell us that as students, like as a nursing, how as a nurse and healthcare professional you have to be careful with all your social media. So I- I think, I guess, I just, I wouldn’t feel professional doing it. I’d feel uncomfortable.

– Jessica, first year student, Faculty of Nursing

Whereas students most often articulated using social media for student-student and student-content educational interactions, with few exceptions students described having a boundary with faculty that generally made social media use seem inappropriate or awkward.

Separating Faculty-Student Interactions from Social Media

An important distinction between student perceptions of social media and other educational technologies occurs in student-student and student-content interactions versus faculty-student interactions via SMTs. In other words, while students generally indicated using social media in their own learning, many students described intentionally choosing not to use certain social media with faculty for what Moore (1989) called “learner-instructor interaction” (p. 2), which Anderson (2008) subsequently called “teacher-student educational interactions” (p.58), and hereafter referred to as faculty-student interactions. By and large, rather than posting questions in an online forum (e.g., on social media or in the institutional LMS called eClass),

students indicated that they would ask questions in a face-to-face meeting or email to the professor or teaching assistant (TA) as a preferred means of communication. Even when working in groups, many students indicated compiling and sending questions (e.g., via a group or class representative) to TAs or professors via email, rather than using other online systems. Second year Pharmacy and Pharmaceutical Sciences student Danielle described this separation as follows: “eClass and e-mail for professors, and then usually Facebook or um, like Google Drive if I’m with students.” Generally, email was seen as more professional and formal for contacting faculty or potentially experts, whereas social media were more casual, informal and for working with other students.

Furthermore, faculty-selected technologies such as eClass and online textbook resources, typically initiated and managed by a faculty member, were commonly seen as a way for students to simply access and download information posted, rather than a way to interact or engage. For example, fourth year Pharmacy and Pharmaceutical Sciences student Caroline noted that eClass is to “draw things off of, right? Like I just pull off lectures, I just download them and then use them for class. So I don’t actually do anything on eClass.” On the other hand, several students, especially those in cohort-learning programs, indicated that SMTs such as Facebook provided an easy-to-use forum for students to interact and share with each other, specifically without faculty present:

And Facebook, it’s just set up so easy to access ‘cause if we wanted to use the chat for eClass on the University site, it’s just so difficult to get into, like people, there so many links, and it’s not clearly like outlined, and then on top of that the professor sees everything, so it’s kind of like oh [Laughs] we- it’s hard to ask questions there.

– Mina, first year student, Faculty of Nursing

Students expressed the specific ways in which they used social media for student-student and student-content interactions, often intentionally separating faculty-student interactions from social media in their learning. Like Mina, several students described eClass as more difficult to use than SMTs like Facebook. Many students, particularly those in cohort-learning programs, described the value of a student-student connection. As Pharmacy and Pharmaceutical Sciences student Danielle stated, interactions via SMTs like Facebook are for “students helping students.”

Indeed, students often expressed the value of having a students-only space for educational interactions, separate from their faculty-student interactions. These student-led spaces in social media were seen to have more “freedom” and fewer restrictions than the more formal, surveilled spaces in eClass:

I think it’s different in the way that on Facebook you can see their [other students’] photos and stuff and information about them, whereas on eClass sometimes it’s like a blank square and just a name and you don’t even know what person you’re talking to in your class.... And I think in the eClass ones they’re more focused and focused towards a specific topic than in Facebook, uh for sure.... [On Facebook] you can take more liberties uh to whatever, you know, be inappropriate or be off topic or, you know, challenge people more.... In my experience, too, people are more rude on eClass. Because um their pedagogy depends on people uh participating in those things and if people leave them then uh then that comes down on them. It’s like you’re doing them a disservice. Whereas Facebook it doesn’t matter if you post or not post.

– Joseph, third year student, Faculty of Arts

For students like Joseph, Facebook is seen as an informal space with less structure and more freedom. Unlike eClass, photos and comments on Facebook are not shared for extrinsic

academic reasons, such as evaluation or grades, instead allowing for greater exploration and “liberties.” Conversely, eClass is a space that is surveilled by what Joseph goes on to describe as “Big Brother” – the professor is an authority figure, and interactions are defined by specific topics and activities often related to evaluation and grades. Many other students noted these differences between social media and other online educational spaces. Social media spaces, such as those within Facebook, are where students choose to communicate with each other, whereas spaces like eClass are meant, as one student phrased it, for “teachers to see my work.”

Social Media for Learning in Disciplinary Contexts

Given the need for further research on disciplinary differences in educational technology and SMT research (G. Smith et al., 2008; Delello et al., 2015), a key purpose of this study is to explore and describe the ways in which undergraduate learners from different disciplines may view social media to be a meaningful part of their learning. Interviews with students across the disciplinary categories of humanities and social sciences, health sciences, and natural sciences and engineering clearly demonstrated the importance of disciplinary contexts in informing not only student social media choices, but also their ways of making meaning in their university learning.

Disciplinary Differences

There is broad overlap across disciplines when students articulated their perceptions and uses of social media for learning. For example, Facebook, YouTube, Wikipedia, and Google Apps were often noted, regardless of discipline. However, the specific examples that students described when discussing meaning making and social media overwhelmingly reflected their particular disciplinary contexts. For example, students in natural sciences and engineering described using Wikipedia to look up formulas or values, or videos shared by the Khan Academy

to visualize concepts they were studying in areas such as physics, biology, or statistics. Students in the humanities and social sciences provided examples related to their disciplinary context, such as using videos to show human movement as it relates to physical education, or using blogs to see specific sociological or humanities examples (e.g., personal perspectives and experiences).

This study reveals a number of differences between the three disciplinary categories examined, discussed in greater detail in the quantitative results and discussion chapters, while the core disciplinary theme recurring in the qualitative phase of the study is largely associated with the distinct ways in which students within cohort-learning programs use social media in their learning. The following discussion focuses on these core qualitative results, showing the important disciplinary contexts in which undergraduate students understand their meaning making processes and social media choices as related to their disciplinary identity, and in the context of this study of undergraduate students at a large, research-intensive university.

Cohort-Learning and Disciplinary Identity

Many students interviewed indicated that they are in cohort-learning programs, largely in the health sciences, but in one instance in the humanities and social sciences. As discussed in regard to information and help seeking aspects, several students in cohort-learning programs noted the importance of SMTs to build their own support networks, for students helping students with a variety of academic and social issues. Disciplinary identity was strongly associated with these cohorts, and in turn with the kinds of meaningful interactions occurring via social media. Students articulated the importance of connecting and sharing between themselves as future nurses, doctors, dental hygienists, and so on. One student, Mary, described the disciplinary identity she possesses as a Nursing student as being “unique” and “special,” and explained the

importance of her cohort and of using Facebook to share nursing memes and disciplinary experiences:

...the whole experience of being a nursing student. Um, and it's kind of like a very unique identity [compared to other Faculties]... with Nursing it's all in just one place, and then you don't interact with any students from any other Faculty. So it's, it's got it's own culture... like special identity, like as a Nursing student or the experience...and you know how there's like University memes and stuff, and there's like nursing-specific memes, and it's just like so interesting because it's so true.... [L]et's say you know you have a clinical starting at like, you have to be at a clinical site by like 6 o'clock so you wake up at 4 o'clock, and then so... so someone like writes a post, like posts a comment like at 4 o'clock in the morning saying "Going to clinical" you know, like "it's still dark outside" or whatever. And then um, and then there are other like students awake at that hour, and then so they would like comment back and say "Me too" and then it's just like the communication I guess like, that helps us through the day...

– Mary, third year student, Faculty of Nursing

Like Mary, many students within cohort-learning programs strongly articulated this association between a unique identity and their cohort, and as a way to identify with their discipline or profession as a part of their day-to-day experiences. Mary went on to describe the differences between her experience in Arts, where she would simply text the three or four students she knew in an English class, as compared to having the power of reaching all 140 Nursing students at once: "when you have like a question about your assignment or clinical... then it's easier to just send one like m- like post on Facebook, so all of the 140 students can read it." Similarly, fourth year Pharmacy and Pharmaceutical Sciences student Caroline noted the difference between her

current experience using Facebook for her cohort-learning program as compared to her prior experiences in larger undergraduate settings, noting that “we have 130 people and I feel like I could talk to any one of them.” The power of connecting to an entire group of students within a discipline-based cohort was commonly described as being part of the overall learning experience, and as related to the use of Facebook specifically.

The size of classes within cohort-learning programs also related to the collaborative face-to-face and online interactions students described in certain disciplines, especially those in the health sciences. Third year student Justin in the Faculty of Medicine and Dentistry noted the differences between cohort-learning and prior experiences in a different discipline: “It was definitely a lot different. It was just going to school, go to class um, go home and study, and there was no connected network...no real team, like the way we have in school [now]...” Like Mary and Caroline, Justin described the value having access to essentially all of the students in his cohort and program via Facebook, of being part of a team, rather than feeling just “like a number” in other large undergraduate classes. In all of these examples, students who strongly identified with their cohorts also strongly identified with their discipline, and articulated the distinct nature of their programs as being important in both their learning and their social media choices.

Further descriptions provide insights into the unique nature of the schedules in specific disciplines, particularly those with cohort-learning programs. Nursing student Mina noted that while other kinds of interactions (e.g., face-to-face coffee meetings, etc.) are valuable, Facebook is an effective way to address time and scheduling challenges:

I’ve gotten like really close with my uh, seminar groups and people that I work with. Um, yeah I think it’s really beneficial. Um, sometimes it’s hard because you just do it over

Facebook.... It's hard to put meaning behind it when it's just over the Internet. But at the same time it's better than nothing because sometimes you just don't have time to even say hi, or like meet them in person for a coffee sometimes, it's just like difficult to take time out of your day. Um, especially with the kind of schedule that I have, like because it's so different from the other Faculties.

– Mina, first year student, Faculty of Nursing

Several students within cohort-learning programs articulated these differences between their current Faculty and other Faculties. Those who had taken undergraduate courses in other Faculties, such as Arts or Science, before beginning programs in Nursing, Dental Hygiene, or Medicine explained this disciplinary difference in their overall learning experience and in their social media interactions.

Students noted the potential challenges and the benefits of being within a particular discipline that has a unique identity, and here again social media is related to the double-edged sword in the context of a unique Faculty or program. Deborah, a first year student in the Faculty of Medicine and Dentistry, also described her Faculty as distinct from others, stating that “a lot of people in our class are pretty driven...I think that separates us a little bit...from other Faculties on campus.... And, you know, sometimes that- that can feel pretty uh isolating.” Many students in cohorts described the value in connecting in person and via their student-student social networks, typically via Facebook groups, to help address the potential isolation of difficult or competitive programs. Those students in cohort-learning programs noted that the overall isolation or challenges students face could be mitigated through cohort support in all disciplines:

[Sighs] Well, uh I think the university is a big place and like they do some things to try to make it smaller, by reducing class sizes and keeping people within those cohorts

throughout their study. But y- you know, that was the case in my field of study but in other people's experiences, that may not be really what happens. So I think Facebook can be a way to create those cohorts on your own with people that you know and then inviting people that they know and introducing you to new people.

– Joseph, third year student, Faculty of Arts

Just as Ian, also an Arts student, and Medicine and Dentistry student Deborah noted in regard to the problem of feeling disconnected a large campus or competitive program, here Joseph (being in a cohort-learning program) described the value of making university not such a “big place.”

Based on his own cohort-learning experiences, Joseph proposed that cohorts could be beneficially expanded via student-focused social networks such as Facebook, even beyond formal cohort-learning program structures, to include students in all areas of the university. In his view, cohort-learning communities created for student-student interactions for both academic and social support have the potential for wider application.

Finally, students within a cohort-learning structure who articulated a strong overarching pedagogical paradigm within their programs, such as context-based learning, indicated a relationship between this pedagogical paradigm and their use of social media. For example, within her Faculty of Nursing program, Alice stressed the importance of context-based learning as it informs collaboration and the use of SMTs such as Google Apps:

Okay, um so we work in small groups um, from about 8-10 people...we learn off of each other, so it's called context-based learning. And um, so we get scenarios, there's about 5 scenarios per course um, within your team, you learn about each scenario, so each scenario is split up in a whole bunch of different topics, and then people are assigned

those topics so then they get compiled onto a Google Doc. And then we would all read it, we'd all have access to it, can edit it and things like that.

– Alice, third year student, Faculty of Nursing

Students who were aware of a specific pedagogical paradigm, such as context-based learning, often articulated this relationship between this pedagogical approach and the ways in which they used social media to help with their university learning; for instance, to facilitate small group activities via online communication and collaboration. While in some cases the use of Google Docs was initiated via scenarios through faculty, in other instances students themselves selected the appropriate SMTs (e.g., Google Apps, Facebook) to help them work within this framework of context-based learning.

Career and Professional Applications

Students within disciplines that had strong associations with a particular career path, or with a professionalized field, particularly in profession-related cohorts, noted the usefulness of social media for specific career and professional applications. Several students indicated that they would use SMTs, such as Facebook, to stay connected to information related to their careers, such as finding out about job opportunities and staying up-to-date with relevant information in their fields. As third year health sciences student Kim noted, many students continued to use Facebook after graduation, which connects current students to those already in the field “‘cause there's still questions on, when the seniors graduate, and how they find jobs and such.” Likewise, first year health sciences student Deborah articulated career applications for social media: “I think Facebook would traditionally be more personal, but now with how our world's progressing, it- it's also educational and important for- for even finding jobs, work, things like that, so.” Regarding the benefits of knowledge application via social media, students

also noted the importance of keeping up-to-date with developments in the field and professional organizations (e.g., the Canadian Dental Hygiene Association, etc.), and this reflects career aspirations and applications. As such, staying up-to-date on information via social media is important not only for current students' university learning, but also in the future for continuous professional development and lifelong learning needed within disciplinary and professional contexts.

Social Media and Meaning Making in Undergraduate Learning

In addition to the interview findings discussed in this chapter, the qualitative phase was crucial in informing the development of the survey instrument, an important contribution of this study. The qualitative phase of the study provided important grounding for the survey instrument, as outlined in the following sections.

Core Categories and Characteristics

A particularly valuable outcome of the interview process was the refinement and validation of categories and characteristics of social media for undergraduate learning. At the beginning of the semi-structured interviews, undergraduate students were asked to describe what social media means to them, including associated characteristics and examples. Participants provided a useful set of articulations defining social media characteristics and purposes, and an outline of the most commonly used SMTs in their learning. The above-outlined qualitative discussion, particularly discussions regarding the ways in social media help or hinder, informed the following core social media characteristics in university learning that were further investigated via the survey: collaborating (e.g., to create documents online); sharing information online; tracking and managing schedules; building relationships (i.e., mainly with peers,

occasionally with instructors); posting/re-posting media or information found; and, commenting on media or information found online.

During the interviews, students often described these characteristics, and the survey provided an opportunity to capture attributes of commenting, sharing, etc., to further investigate these categories with a broader sample of students. For instance, during interviews students made distinctions between building relationships with other students (student-student interactions) versus using (or, not using) social media for building relationships with faculty (faculty-student interactions). It proved valuable to probe deeper into these initial findings via further quantitative investigation, as described in the subsequent quantitative results chapter. For the “building relationships” example, the survey confirmed interview results that overall, students indicated higher agreement for using SMTs with peers rather than faculty.

After discussing social media in their university contexts, students were also asked whether they used any of the specific SMTs within or beyond the updated categories of social media in their learning (see in Table 4.2, below, which informed the interview guide and discussions, as related to constant comparison). As part of this constructive process, interviews with undergraduate students provided the validation and refinement of the categories and characteristics of social media, subsequently used in the survey instrument, via generic qualitative and CGT techniques. Through the validation and refinement process described above, the exclusion of certain social categories was necessary: social games, virtual worlds, email, and feed readers. To prevent duplication, professional networks (e.g., LinkedIn) are captured under the category of social networks. Some students provided descriptions of eClass (i.e., the LMS) during their interviews, often while they themselves questioned whether eClass should be considered social media. Overall interview results demonstrate that LMS and web-conferences

are most often used for instructor-led rather than student-led interactions, and have distinct parameters and features differing them from social media platforms. This confirmed exclusion of these items (e.g., LMS and web conferencing) from categories of social media for learning.

Table 4.2

Updated Categories of Social Software

Valtonen et. al's 2010 Updated Categories of Social Software	Smith's Updated Categories of Social Media*
<ul style="list-style-type: none"> • Blogs (e.g., <i>Blogger</i>, <i>Vuodatus</i>) • Wikis (e.g., <i>Wikipedia</i>, <i>Wikispaces</i>) • Google tools (e.g., <i>Google calendar</i>, <i>Google doc</i>) • Image sharing (e.g., <i>Flickr</i>) • Social bookmarking (e.g., <i>Delicious</i>) • Social networking (e.g., <i>Facebook</i>, <i>MySpace</i>, <i>IRC-gallery</i>) • Instant messaging (e.g., <i>MSN Messenger</i>, <i>Skype</i>, <i>Google Talk</i>) • Social games (e.g. <i>World of Warcraft</i>) • Virtual worlds (e.g., <i>Second life</i>, <i>Habbo hotel</i>) • Professional networking (e.g., <i>LinkedIn</i>) • Do-it-yourself networks (e.g., <i>Ning</i>) • File sharing (e.g., <i>Kazaa</i>, <i>BitTorrent</i>, <i>eMule</i>) • Video sharing (e.g., <i>YouTube</i>, <i>Google video</i>) • Microblogs (e.g., <i>Twitter</i>, <i>Qaiku</i>) • Email services (e.g., <i>Gmail</i>, <i>Live</i>, <i>Hotmail</i>) • Feed readers (e.g., <i>RSS</i>) 	<ul style="list-style-type: none"> • Blogs (e.g., <i>Blogger</i>, <i>WordPress</i>) • Wikis (e.g., <i>Wikipedia</i>, <i>Wikimedia</i>) • Google Apps (e.g., <i>Google calendar</i>, <i>Google docs</i>) • Image sharing (e.g., <i>Flickr</i>, <i>Instagram</i>, <i>Pinterest</i>) • Social bookmarking (e.g., <i>Delicious</i>) • Social networking (e.g., <i>Facebook</i>) • Social news sites (e.g., <i>Reddit</i>) • VOIP & Instant messaging (e.g., <i>Skype</i>, <i>Google talk/chat</i>) • Social games (e.g. <i>World of Warcraft</i>) • Virtual worlds (e.g., <i>Second life</i>, <i>Habbo hotel</i>) • Professional networking (e.g., <i>LinkedIn</i>) • Do-it-yourself networks (e.g., <i>Ning</i>) • File sharing (e.g., <i>Dropbox</i>, <i>Google Drive</i>, <i>BitTorrent</i>) • Video sharing (e.g., <i>YouTube</i>, <i>Vine</i>) • Location-based applications (e.g., <i>Foursquare</i>, <i>Google Maps</i>) • Microblogs (e.g., <i>Twitter</i>) • Email services (e.g., <i>Gmail</i>, <i>Live</i>, <i>Hotmail</i>) • Feed readers (e.g., <i>RSS</i>)

*new or updated items denoted in **bold**; items removed denoted with strikethrough.

Ways of Making Meaning in Undergraduate Learning

Another valuable outcome of the interview process was gaining an understanding of how undergraduates perceived and articulated the ways that they made meaning (make sense) of their university learning. As with philosophies of teaching and learning, aspects of meaning making are often tacitly held, and are therefore difficult to explicate. As such, during the interviews, many students noted that they needed a moment to reflect upon and clarify their thoughts before responding to meaning making questions, which is not surprising given that time and reflection is often needed to articulate complex, tacitly held knowledge. Undergraduates articulated clearly the ways in which they make meaning, and connected these ways of meaning making to their university learning and social media choices.

Regarding the context of their university learning, at the beginning of the semi-structured interviews, each student was asked to describe what meaning making (making sense) meant to them, as well as to give some associated characteristics and examples. Several students articulated the importance of meaning making in university; for instance, Arts student Joseph stated that “I think in general, meaning making is something that every student is up against in order to make sense of new knowledge and new learning that comes with being in university.” Similarly, second year Arts student Hillary noted that “I think it’s one of the main goals of getting a university education is to make meaning of the world around you.” Overall, many students recognized meaning making as something that every student faces and as “one of the main goals” of university learning.

Several recurring themes emerged when students articulated what meaning making meant to them, and the specific ways in which they described their meaning making process varied from gaining a deep understanding of key concepts to interacting with different perspectives and

putting their learning into context. Throughout the interviews, undergraduates provided many interesting and unique definitions and examples related to the process of fully and deeply understanding, resulting in nine core categories of making meaning in their university learning:

- **Gaining deep understanding (e.g., of a concept).** For example, fourth year Arts student Greg described making meaning as “having a deep understanding,” and fourth year Faculty of Physical Education student Mike articulated it as “trying to understand the concepts that are involved within a class.”
- **Saying something in your own words.** For instance, first year Nursing student Mina described making meaning as “[u]nderstanding it, like comprehension um, being able to say it in your own words after you hear it.” Second year Arts student Erin similarly described it as “being able to put that meaning into your own words... showing that you understand it by being able to explain it by yourself.”
- **Interacting with different perspectives.** For example, as third year Arts student Geoffrey noted, gaining perspective is “the primary point.” First year Nursing student Jessica also described making meaning as “not only getting my perspective but other people’s perspectives as well, so asking others what they think or their opinions or their input...”
- **Discussing with other people.** For example, first year Arts student Sonya stated she would “talk it out with someone to like look at all the aspects of it, and really understand. Like the- the grasp of the concept.” Similarly, first year Science student Thomas noted that making meaning can involve “discussing it [a problem] with someone else.”
- **Applying experience to real life (e.g., your career).** First year Science student Dorothy described making meaning as being able “to understand what you’re doing and to be able

to apply it in a different situation.” Likewise, third year Faculty of Medicine and Dentistry student Kim described it as follows: “since we’re in University we’re here to pursue a career so I think making meaning of something would be something that applies to life, either other people’s life, or your own life.” In the interviews, many students described this as “real life” application.

- **Putting learning into context.** For example, first year student Katie from the Faculty of Agriculture, Life, and Environmental Sciences described making meaning as “[h]elping to understand and to put context into whatever the thing is.” First year Arts student Amanda described it as “having the resources to be able to um, understand something fully...in a way that is contextualized to yourself and to your experience.”
- **Researching information.** For instance, first year Arts student Anne described making meaning as “talking to other people or like researching on the Internet, or just going to office hours. [Laughs].”
- **Seeking help from others.** For example, second year Science student George described this process as follows: “to make sense of something...at first you don’t understand it. So I guess this is when you would go to an outside source to look for help to assist you in understand, trying to understand whatever it is you’re not understanding.”
- **Working through the process of figuring something out (e.g., solving a problem).** For example, first year Science student Thomas described making meaning as “working through a problem...trying to, yeah I suppose just work through it...”

As outlined regarding the importance of understanding the context (such as discipline) and the intention of the educational interactions in question, these ways of making meaning were often

discussed in relation to specific social media choices and uses. The relationship between these ways of making meaning and specific social media is outlined in greater detail in chapter 6.

Overall, when asked whether they believe that the use of social media is successful in supporting their learning in a meaningful way, the majority of students replied with affirmative statements, such as “oh yes,” “yeah for sure,” “yeah definitely” and “definitely, yes.” This was echoed in more detailed descriptions of social media in university learning, where many students (particularly those in cohort-learning programs) noted that being connected via social media is a necessity in their learning and in their day-to-day lives, as the following illustrates:

I would say [social media] helps me make sense of my learning, ‘cause honestly, like throughout junior high to now, I’ve been using the Internet and technology for so long and social media as well, ‘cause I got Facebook in grade 8. So I’ve been using it for a long time. And on top of that, like I wouldn’t know [Short pause] what I would do without- without it, [laughs] sad as that sounds.

– Jessica, first year student, Faculty of Nursing

Like Jessica, others health sciences students such as Danielle noted that learning would be harder without social media: “...every day I use it, and I just don’t even realize how important that [social media] is now.” Justin, also in health sciences, noted that “It would be definitely a lot harder if I didn’t have Facebook, if I didn’t have Google.... [I]t’s almost impossible really to go through this program without having, being connected, like that.” However, even though many students indicated that social media does support their learning in meaningful ways, they often added that whether it supports learning meaningfully often “depends,” reiterating the double-edged nature of social media in having the potential to both help and hinder their learning for the reasons outlined above.

Social Media Interactions Over Time: Past, Present, and Future

To gain an understanding of social media in contexts related to the research questions (e.g., to compare disciplines, to determine if there were differences based on age, etc.), students were also asked to describe their social media use in the past (e.g., high school, earlier years of university, etc.), present use, and anticipated future use (e.g., potential social media use in future university years or after graduation). This temporal lens provided interesting connections between the themes students discussed, particularly in descriptions of the context or changes that provided insights into the reasons *why* students may either maintain or change social media choices in their own learning. For example, while many students indicated using and being aware of SMTs such as Facebook, Skype, YouTube, and Google Apps in their prior learning, the needs of connecting and saving time in university were often described as being new and unfamiliar from prior interactions students had in high school:

Um I used it before in first year.... [I]t was just really strange because coming out of high school, you know, you're used to having all this time to be able to interact personally, given class time to do it, but then you're thrown into [university] and ...you don't know anybody and everyone's just on d- different schedules...yeah it's just a different mentality of what you're doing. And, it was a bit difficult adjusting to [the technology]...I prefer the face-to-face interaction, but um after that first assignment, uh it was- it was a lot easier to get used to the forum....

– Erin, second year student, Faculty of Arts

Here, Erin described her difficulty adjusting to the different schedules and expectations of collaboratively working (often via social media such as Google Apps) in ways that were

unfamiliar, though she noted that she soon became more comfortable with new technologies and processes, such as the online forums.

What is clear from descriptions such as Erin's is how some students can have difficulty adjusting to online interactions in university, and do not necessarily enter first year of university with the requisite skills, understanding, or comfort level necessary for successful online interactions in this new context. This illustrates how not every student knows how to use SMTs such as Google Docs when entering university, a point reiterated by others:

... 'cause with Google Docs, if you go to the university, you can find anyone on there.

But not everybody checks it, or knows how to use it... a lot of the time I'll be like, "Hey, well let's start a Google Doc," and then people will be like "Oh what's that?" And then you just have to teach 'em. So easy to get the hang of it though, so.

– Jessica, first year student, Faculty of Nursing

Students often described being unfamiliar with certain technologies, or working with students to learn SMTs, and as a result having to learn technologies like Google Apps quickly, often from other students. This is because, as first year health sciences student Deborah noted, "it's very different from past learning... [social media is] a much more educational tool. It was never anything like that prior to this year for me." Many students (particularly those in the first year of their program) described how the new demands of their university program meant that, even if they preferred primarily face-to-face collaborations during high school, social media soon became necessary as a part of their undergraduate university learning, especially in order to work collaboratively and manage their academic demands, particularly in cohorts.

Developing Over Time

Following on this topic of learning how to use social media in a university context, first year Science student Brad relates this to the skill of becoming an independent learner, which he described as becoming even more important over time and increasingly essential in university: “high school...back then you don’t have those skills that uh, you have to be an independent learner...” Brad continued to describe building the ability to be an independent learner; for instance, by effectively finding and applying information via sources such as YouTube. For Brad, Erin, and others, the ability to work with social media in new circumstances – moving from face-to-face to online interactions, learning to use SMTs as an independent learner – are developed progressively over time, rather than being inherently present. Indeed, when discussing their past, present, and future learning experiences, several students suggested the importance of educating students about such technologies for learning. For example, David noted that social media was not implemented in his high school learning, and suggests that educational initiatives should be aimed at developing students’ deeper understanding of learning with technology:

I’ve had the experience of doing both the [educational system in another country] and...the Canadian [educational system], and I don’t know, a lot of it, the- the education around um technology is how to do it, but not really what you should use it for...

– David, third year student, Faculty of Engineering

This echoes earlier student descriptions regarding the need for students to learn more about technology in their learning, from topics such as information, digital, or media literacies, to promoting awareness of education and technology issues, to what facets of technology can and should be related to learning. As such, students articulated a number of important areas for

educational initiatives that would help undergraduates as they face choices to use or not use social media as a part of their own learning.

Reflection and Application Post-Learning

In terms of temporal contexts, other students noted that they valued being able to have a concrete record of previous interactions, to follow-up on or to reflect upon their learning through further interaction either in person or online:

And um it's a good way to remember things, too, like that you've said in the past, whereas in personal interactions you can't really put your finger on it but you can always go back to Facebook and say, "Remember that thing you wrote in first year about that? Man, I can't believe we thought that," or, you know, like, "We were sure naive," or something like that. And then again that sparks conversations. And, in a way, it's sort of back and forth but it's not- it's not confined to that [Facebook] space.

– Joseph, third year student, Faculty of Arts

This description conveys the timeline feature on social media like Facebook, whereby interactions at different points in time are highlighted, as well as the interplay between SMTs and face-to-face interactions in learning.

In addition to looking back on interactions early in one's university experience, students spoke about growing their knowledge and abilities over time, referring to social media as a "post-learning" tool. This phrase indicates that while some students may not initially learn via social media, it can be used to share and apply their learning in broader contexts *after* solidifying their own understanding. Some students described waiting to share via SMTs until after they felt they possessed a certain level of expertise. For instance, regarding interactions on Reddit, second year Arts student Ian noted that it is "[m]ore of a place to test out my learning as opposed to

actually learn new things. More just apply the things I have learned.... More of a post-learning tool than an actually learning tool in itself.” As such, some student-content interactions change over time, starting as content-consumer and then later potentially moving to content-producer. These articulations of building knowledge over time reflect comments about the changes encountered early in university, as well as those that students forecasted in later university years. For example, George forecasted that by fourth year one should be able to apply one’s expertise, becoming more of a contributor than just a consumer or viewer of social media content:

Well in the fourth year position I would assume by then you would be kind of experienced in your field. And trying to find information especially in a specific area is a lot harder to find online.... So like by fourth year, I would expect to be the one contributing to Wikipedia articles rather than be the one reading it.

– George, second year student, Faculty of Engineering

These initial student-content social media interactions are often viewed to be most useful for building foundational or basic concepts during learning, with potential social media contributions occurring for application *after* learning has been developed and solidified. Looking back at interactions retrospectively, or having future-looking aspirations to share and apply knowledge after expertise has been acquired post-learning, underscores use of social media for making meaning as a process that occurs over time.

Generational Aspects

A final yet important temporal component of the interviews involved student descriptions regarding their perceptions of the aspects of social media and meaning making that relate to their generation. Throughout the interviews, most students noted that certain social media (notably, Facebook) are a ubiquitous part of their lives and the lives of those in their peer groups. Though

students acknowledge that not everyone is on Facebook, they viewed this tool to be something that *nearly* everyone in their age group has. As Kyle, as second year student in Engineering, put it: “it’s almost universal for our generation to have Facebook accounts.” Facebook was frequently discussed as being “almost universal,” however many students viewed several other SMTs (e.g., YouTube, Twitter, and Instagram) as both being used by and marketed towards young people. For example, first year Arts student Amanda described social media content, in this case on YouTube, as “geared towards people who are my age, made by people who are my age, and it’s um, it’s interesting information.” Similarly, when asked if many people in his age group are on Instagram, first year Science student Richard stated “[d]efinitely, especially my age group.” In this way, many students did associate being in a younger generation with social media, particularly as a way to connect and communicate with their peers.

Continuing this theme, several students described using SMTs as just one of the ways that they make sense of their experiences by connecting with those in a similar “life phase.” For example, second year Arts student Hillary noted that she values seeing perspectives from other students and those who are in a similar life phase because “it’s a perspective that applies directly to my life phase.” Other students noted how sharing experiences and perspectives relates to their life phase, illustrating the importance of the context or experience rather than solely technology. As Brad, a first year Science student, described “[u]nless like you’ve gone through the same phase as me, than I don’t expect you to understand what the situation that I’m in, like that my feelings are at that point...” In these examples, reflections on the importance of life phase relates not to a particular technological medium, but rather the shared experiences and perspectives that can be found within and beyond social media.

While students made associations between belonging to a younger generation and being on social media, they often described this connection in terms of technological exposure being part of life rather than describing social media knowledge and skills as something they innately possess. Many students described how they “grew up” surrounded by technologies, including the Internet and social media, creating a great amount of exposure. Here again, students’ descriptions reflected a double-edged sword:

... people say that um my generation and uh like specifically, we don’t really know how to converse anymore. And generally I think that is true because um social media makes it, gives almost people that kind of drunken courage that you get like from liquor almost, like you’re- you can say this but like nobody’s actually seeing you say it. So you can post things like you know what, it’s posted, I’m done, I can walk away now and the consequences of that, you know, I don’t care. I can just delete it. Um, so it’s made people anonymous and almost um not really caring about the consequences of what they do on the Internet, ‘cause it stays on the Internet and um it’s never really gonna leave....I grew up with it [technology], basically...I don’t really know what it’s like to go without it... Like it’s um it’s almost like a comfort zone. It’s something that’s always been there.

– Erin, second year student, Faculty of Arts

Here, Erin described being comfortable with technology because it has been a part of her life, but she also portrayed a darker, almost “drunken” side to social media. Other students also related being comfortable with technology due to exposure. Fourth year Arts student Greg noted that “I’ve been around computers my whole life and so I’m very comfortable with it.” However, comfort with technologies such as social media comes with an awareness of several drawbacks, as Erin noted, in reducing one’s abilities in other ways of communication. Others described what

is lost and gained via social media for their generation. First year Nursing student Mina stated that, while she likes the speed and ease of social media, “just everything is so fast and easy to do [via social media]...I think our generation, like we’re not very patient either because we have all this technology.” According to these students, while much is gained through technologies like social media in terms of fast and easy access to information and communication, much is also lost, including abilities to converse and to be patient.

The theme of the double-edged sword of social media continued in student reflections of how ubiquitous exposure to technologies can result in dependence for their generation. As third year Arts student Geoffrey stated, “I’ve grown up with these um tools around me and um as a result... [to a] fairly large extent [I have] become dependent upon them...” One student reflected on the benefits of having limited technology exposure to avoid over dependence:

...for most of my life I’ve never been surrounded by much technology...our parents never gave us like uh, [a] lot of technology to work with.... I thanked them today for that because I think it would definitely have hindered it [learning] because I’ve seen my friends around me it’s like their life has become dependent on it [technology].

– Brad, first year student, Faculty of Science

What Brad and Geoffrey related is the double-edged sword that students face when making choices about using SMTs in their learning. While students overwhelmingly indicated the many benefits of technologies such as social media, there was continued recognition of how over exposure can create dependence, hindering individuals and their generation as a whole.

Summary of Qualitative Findings

The qualitative findings provide new insights into student perspectives and uses of social media, and the variety of ways in which they intentionally choose, or choose not, to

meaningfully incorporate social media into their university learning. The interviews detail the specific ways in which social media can help and hinder learning as what students call a double-edged sword. Important disciplinary differences for social media perceptions and uses emerged, with students from professionalized and cohort-based programs (primarily in the health sciences) articulating important ways that SMTs can create student communities and relate to their disciplinary identities. Student perspectives and descriptions formed key recurring themes, which emerged into several core categories and characteristics of social media, as well as core categories of meaning making in undergraduate learning. The qualitative phase provided a critical foundation for the development of a new survey instrument to further explore the student perspectives and uses of social media in meaningful ways, the results of which are described in the subsequent chapter outlining quantitative findings.

Chapter 5

Quantitative Results

This chapter summarizes and presents findings from an analysis of student responses to the online survey ($N = 679$). These quantitative survey results were analyzed with the use of SPSS software via quantitative analysis features and using the methods described above. The researcher conducted this descriptive analysis to analyze the survey responses as they related to the study's research questions. Aligned with the overarching MMR and social constructivist methodologies guiding this study, the open-ended (textual string) responses were consistently analyzed via the generic qualitative and CGT techniques (e.g., coding, constant comparison) employed for the qualitative analysis of the interviews.

Exploring Relationships: Undergraduate Meaning Making and Social Media

This analysis of the survey phase focuses on exploring and describing the presence or absence of the phenomena studied, as well as on the characteristics of meaning making and social media indicated by participants as related to (*RQ2*), seeking to identify what characteristics of social media undergraduate learners see as contributing to their meaning making during their university learning. This analysis outlines the notable differences, relationships, or patterns found (e.g., in disciplinary groups), as related to (*RQ1*), which asks: in what ways do undergraduate learners from different disciplines view social media to be a meaningful part of their university learning?

Overview of Descriptive Analyses

Supporting descriptive analyses of the survey results are provided in detail in Appendix A, and the survey instrument is included in Appendix B. Overall, undergraduate students ($N = 679$) from across disciplines at the University of Alberta participated in the survey (see

Tables A1.2 and A1.3 in Appendix A). The string responses provided in the open-ended (*other – please specify*) field were often related to Open Studies, and thus were placed under a fourth group called Other & Open Studies ($n = 19$, 2.9%). Since these open-ended responses are outside of the disciplinary framework employed, and had a very low number of overall responses, discipline-related items were analyzed according to the three disciplinary categories of Health Sciences ($n = 74$, 11.4%), Natural Sciences & Engineering ($n = 319$, 49.2%), and Humanities & Social Sciences ($n = 237$, 36.5%), excluding Other & Open Studies.

Respondents from across all undergraduate years participated in the survey: (1) First Year ($n = 135$, 21.2%), (2) Second Year ($n = 128$, 20.1%), (3) Third Year ($n = 158$, 24.8%), and (4) Fourth Year ($n = 181$, 28.4%). A majority of respondents were full-time students ($n = 606$, 94.2%), with a larger percentage of females ($n = 442$, 68.6%) than males ($n = 201$, 31.2%). There was a larger percentage of local (non-international) ($n = 590$, 91.0%) than international respondents ($n = 58$, 9.0%). The mean age of respondents was 22.3 years (birth year of 1992; see Tables A1.1 in Appendix A), and a majority of respondents ($n = 624$, 96.4%) were in the digital native category, which aligns with the focus of the study.

Meaning making in university learning. In terms of making meaning, a higher percentage of respondents indicated making sense of their university learning individually (personally) ($n = 293$, 46.4%) or both individually (personally) and with others (socially) ($n = 306$, 48.4%), rather than solely with others (socially) ($n = 33$, 5.2%). The most frequently selected ways to make meaning of university learning were gaining your own deep understanding, applying your experience to real life, and working through the process of figuring something out, as demonstrated in Table 5.1 below.

Table 5.1

Q10: How do you make meaning ("make sense") of your university learning?

Variables (highest to lowest frequency)	Yes <i>n</i> (%)	No <i>n</i> (%)
Ways of making meaning		
Gaining your own deep understanding	501 (73.8)	178 (26.2)
Applying your experience to real life	431 (63.5)	248 (36.5)
Working through the process of figuring something out	426 (62.7)	253 (37.3)
Putting your learning into context	382 (56.3)	297 (43.7)
Saying something in your own words	355 (52.3)	324 (47.7)
Interacting with different perspectives	323 (47.6)	356 (52.4)
Researching information	321 (47.3)	358 (52.7)
Discussing with other people	368 (45.8)	311 (45.8)
Seeking help from others	257 (37.8)	422 (62.2)

Social media use, importance, and characteristics. Notably, a majority of respondents indicated using social media in their own university learning ($n = 451$, 71.5%). Students who use social media in their learning indicated that the most frequently used SMTs (see Table 5.2 below) closely mirror those perceived to have the highest importance in learning (see Table 5.3 below). For those who indicated using social media in their learning, in terms of usefulness for university learning the most frequently selected as well as the highest agreement for social media characteristics are shown in Table 5.4 below. Supporting information regarding the mean, median, and mode is included in Appendix A. For making meaning of university learning (see Table 5.5 below), agreement for social media characteristics was given in the same order, though with somewhat lower overall means and percentages.

Table 5.2

Q13: In your own university learning, do you use any of the following?

Variables (highest to lowest frequency)	Yes <i>n</i> (%)	No <i>n</i> (%)
Specific SMTs		
Google Apps (e.g., Google Calendar, Google Docs)	351 (51.7)	328 (48.3)
Social networking (e.g., Facebook, Google+)	336 (49.5)	343 (50.5)
File sharing (e.g., Dropbox, Google Drive, BitTorrent)	308 (45.4)	371 (54.6)
Video sharing (e.g., YouTube, Vine)	293 (43.2)	386 (56.8)
Wikis (e.g., Wikimedia)	274 (40.4)	405 (59.6)
VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)	171 (25.2)	508 (74.8)
Image sharing (e.g., Flickr, Instagram, Pinterest)	121 (17.8)	558 (82.2)
Blogs (e.g., Blogger, WordPress)	120 (17.7)	559 (82.3)
Microblogs (e.g., Twitter)	97 (14.3)	582 (85.7)
Location-based applications (e.g., Foursquare, Google Maps)	88 (13.0)	591 (87.0)
Social news sites (e.g., Reddit)	68 (10.0)	611 (90.0)
Social bookmarking (e.g., Delicious)	15 (2.2)	664 (97.8)
Do-it-yourself networks (e.g., Ning)	13 (1.9)	666 (98.1)

Table 5.3

Q14: In your opinion, do you see these social media as an important part of your university learning?

	<u>Strongly Agree</u>		<u>Agree</u>		<u>Neutral</u>		<u>Disagree</u>		<u>Strongly Disagree</u>	
	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent
Blogs (e.g., Blogger, WordPress)	18	4.2%	94	22.0%	159	37.2%	102	23.9%	54	12.6%
Wikis (e.g., Wikimedia)	131	30.7%	163	38.2%	82	19.2%	35	8.2%	16	3.7%
Google Apps (e.g., Google Calendar, Google Docs)	187	43.1%	162	37.3%	59	13.6%	16	3.7%	10	2.3%
Image sharing (e.g., Flickr, Instagram, Pinterest)	19	4.4%	78	18.2%	162	37.8%	98	22.8%	72	16.8%
Social bookmarking (e.g., Delicious)	8	1.9%	24	5.7%	189	44.6%	117	27.6%	86	20.3%
Social networking (e.g., Facebook, Google+)	72	16.7%	179	41.4%	107	24.8%	46	10.6%	28	6.5%
Social news sites (e.g., Reddit)	18	4.3%	86	20.3%	168	39.7%	92	21.7%	59	13.9%
VOIP and Instant messaging (e.g., Skype, Google Talk, WhatsApp)	57	13.3%	151	35.4%	143	33.5%	45	10.5%	31	7.3%
Do-it-yourself networks (e.g., Ning)	8	1.9%	38	9.1%	222	53.2%	79	18.9%	70	16.8%
File sharing (e.g., Dropbox, Google Drive, BitTorrent)	211	49.2%	150	35.0%	54	12.6%	9	2.1%	5	1.2%
Video sharing (e.g., YouTube, Vine)	142	32.9%	182	42.2%	70	16.2%	25	5.8%	12	2.8%
Location-based applications (e.g., Foursquare, Google Maps)	22	5.2%	72	17.1%	180	42.8%	88	20.9%	59	14.0%
Microblogs (e.g., Twitter)	19	4.5%	67	16.0%	155	36.9%	106	25.2%	73	17.4%

Table 5.4

Q15: In your opinion, are the following characteristics of social media useful for your university learning?

	<u>Strongly Agree</u>		<u>Agree</u>		<u>Neutral</u>		<u>Disagree</u>		<u>Strongly Disagree</u>	
	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent
Building relationships with peers (e.g., Facebook, LinkedIn)	171	40.1%	200	46.9%	39	9.2%	11	2.6%	5	1.2%
Building relationships with instructors (e.g., Facebook, LinkedIn)	55	12.9%	146	34.4%	127	29.9%	67	15.8%	30	7.1%
Creating media to share online (e.g., pictures, videos, music)	73	17.2%	198	46.7%	96	22.6%	43	10.1%	14	3.3%
Sharing information online (e.g., links to websites, articles)	187	44.4%	197	46.8%	22	5.2%	12	2.9%	3	0.7%
Posting/Re-posting media or information found online (e.g., re-tweeting, sharing links)	113	26.9%	188	44.8%	79	18.8%	33	7.9%	7	1.7%
Commenting on media or information found online	65	15.5%	170	40.5%	115	27.4%	60	14.3%	10	2.4%
Collaborating to create documents online (e.g., Google docs)	249	59.0%	141	33.4%	24	5.7%	7	1.7%	1	0.2%
Tracking and managing your academic schedule	223	52.7%	150	35.5%	36	8.5%	11	2.6%	3	0.7%

Table 5.5

Q16: In your opinion, do the following characteristics of social media help you to make meaning (make sense) of your university learning?

	<u>Strongly Agree</u>		<u>Agree</u>		<u>Neutral</u>		<u>Disagree</u>		<u>Strongly Disagree</u>	
	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent	<i>n</i>	percent
Building relationships with peers (e.g., Facebook, LinkedIn)	127	30.0%	191	45.2%	62	14.7%	37	8.7%	6	1.4%
Building relationships with instructors (e.g., Facebook, LinkedIn)	60	14.3%	144	34.2%	115	27.3%	76	18.1%	26	6.2%
Creating media to share online (e.g., pictures, videos, music)	71	16.9%	168	40.0%	111	26.4%	54	12.9%	16	3.8%
Sharing information online (e.g., links to websites, articles)	127	30.2%	217	51.5%	56	13.3%	16	3.8%	5	1.2%
Posting/Re-posting media or information found online (e.g., re-tweeting, sharing links)	78	18.5%	176	41.8%	114	27.1%	40	9.5%	13	3.1%
Commenting on media or information found online	59	14.0%	144	34.3%	144	34.3%	55	13.1%	18	4.3%
Collaborating to create documents online (e.g., Google docs)	187	44.3%	164	38.9%	54	12.8%	11	2.6%	6	1.4%
Tracking and managing your academic schedule	144	34.2%	169	40.1%	77	18.3%	25	5.9%	6	1.4%

Reasons to use social media in learning. In response to open-ended Q17 (please take a moment to tell us *why* you use social media in university learning), students articulated several reasons for using social media in university learning, including: “Building relationships with classmates and colleagues, sharing materials like articles and Google docs, and managing a crazy schedule!” In total, six core categories emerged from the open-ended responses:

- **Time and organization** (e.g., efficiency), for example: “Facilitates my learning, makes things more efficient. Allows me to be more organized and manage my time better.”
- **Communicating and connecting** (e.g., collaborating with peers), for example: “Easy way to connect and communicate.”
- **Keeping up-to-date** (e.g., news, events), for example: “On Facebook I like pages related to my field of study and they keep me up to date on the latest advances of the subject.”
- **Information and help seeking** (e.g., finding resources), for example: “...find resources to help with study.”
- **Sharing and application** (e.g., other perspectives, program or career, real life), for example: “It's another way of interacting and sharing idea with not just my own peers, but others in the same field.”
- **Building understanding** (e.g., concepts), for example: “...Wikis are especially helpful for grasping basic concepts when you aren't able to understand from class.”

These themes are illustrative of the reasons why students who use social media in their learning do so, and closely reflect the helping categories that emerged during the qualitative interviews.

Reasons not to use social media in learning. In response to Q18 (please take a moment to tell us *why* you do not use social media in university learning), there are also several reasons why one would not use social media in university learning. One student indicated: “I use social

media for interacting with friends in my down time. It is too distracting to use for school purposes. If I want to discuss a concept with someone I talk about it face to face.” Alongside this statement, a total of five themes emerged from the open-ended responses:

- **Distraction and focus** (e.g., takes time away from learning), for example: “Social media is often distracting, and takes away from the focus required to actually reach proper understanding of a topic.”
- **Preference to learn other ways** (e.g., individually, face-to-face, print), for example: “I prefer to discuss topics with other students in person and I study well on my own as well.”
- **Lack of credibility** (e.g., reliability of information), for example: “You have to be careful whether or not it is a reliable source.”
- **Privacy and anonymity**, for example: “It's irrelevant and unnecessary. I prefer to keep my social and academic life separate.”
- **Lack of awareness or need** (e.g., no want or need to use, access), for example: “I didn't know it was an option.”

These themes provide important insights into the reasons why students choose *not* to use social media in their university learning. These themes closely align with the hindering categories that emerged from the qualitative interviews. Since this question (Q18) focused broadly on reasons for not using social media, in addition to seeing the hindering aspects reflected, there is also the presence of *lack of awareness or need*, showing that students themselves recognized that they are not always aware of the ways in which social media can be used in learning.

Descriptive Analyses Related to Contextual Factors

Several survey components related to the study's research questions (e.g., discipline, age, meaning making, and other contextual factors) were analyzed using descriptive statistics.

Overall, the results illustrate several interesting findings according to discipline, meaning making, and social media in university learning. The following section summarizes the results for descriptive analyses related to these contextual factors.

Discipline and Ways of Making Meaning

When examining the responses according to discipline and (Q10) ways of making meaning, there were several notable differences, as follows (see further supporting data in Table A1.7):

10 c) Interacting with different perspectives.

Specifically, a higher percentage of those in Humanities & Social Sciences ($n = 141$, 59.5%) selected Yes for interacting with different perspectives to make meaning of their university learning, which is a somewhat higher percentage than those in Health Sciences ($n = 40$, 54.1%), and a much higher percentage than those in Natural Sciences & Engineering ($n = 132$, 41.4%).

10 e) Applying your experience to real life (e.g., your career).

A higher percentage of those in Humanities & Social Sciences ($n = 172$, 72.6%) and Health Sciences ($n = 52$, 70.3%) selected Yes for applying experience to real life to make meaning of their university learning, differing from the lower percentage reported in Natural Sciences & Engineering ($n = 196$, 61.4%).

10 f) Putting your learning into context.

Again, a higher percentage of students in Humanities & Social Sciences ($n = 157$, 66.2%) and Health Sciences ($n = 49$, 66.2%) selected Yes for putting learning into context to make

meaning of their university learning, differing from the lower percentage reported in Natural Sciences & Engineering ($n = 171, 53.6\%$).

10 i) Working through the process of figuring something out (e.g., solving a problem). Here, a higher percentage of students in Natural Sciences & Engineering ($n = 232, 72.7\%$) selected Yes for figuring something out (e.g., problem solving) to make meaning of their university learning, as compared to a somewhat lower percentage reported in Health Sciences ($n = 50, 67.6\%$), and differing greatly from the lower percentage reported in Humanities & Social Sciences ($n = 135, 57.0\%$).

Table 5.6

Meaning Making Individually Versus Socially by Discipline

			Discipline			
			Health Sciences	Natural Sciences & Engineering	Humanities & Social Sciences	Total
How do you most often make meaning ("make sense") of your university learning?	individually (personally)	Count	31	155	99	285
		% within Discipline	42.5%	50.3%	42.9%	46.6%
	with others (socially)	Count	2	12	15	29
		% within Discipline	2.7%	3.9%	6.5%	4.7%
	both individually (personally) and with others (socially)	Count	40	141	117	298
		% within Discipline	54.8%	45.8%	50.6%	48.7%
	Total	Count	73	308	231	612
		% within Discipline	100.0%	100.0%	100.0%	100.0%

Discipline and Individual versus Social Meaning Making

When examining discipline and (Q11) making meaning individually versus socially, responses were similar across disciplines, as outlined in Table 5.6 above.

Discipline and Social Media Use

When examining discipline and (Q12) general social media use, there was very little difference in the percentage of students who indicated they use and do not use social media in their university learning across disciplines, though a somewhat higher percentage of students in Health Sciences indicated social media use. Further supporting data is outlined in Table 5.7.

Table 5.7

General Social Media Use by Discipline

		Discipline				
		Health Sciences	Natural Sciences & Engineering	Humanities & Social Sciences	Total	
Do you use social media in your own university learning?	Yes	Count	58	220	164	442
		% within Discipline	79.5%	71.7%	71.0%	72.3%
	No	Count	15	87	67	169
		% within Discipline	20.5%	28.3%	29.0%	27.7%
Total	Count	73	307	231	611	
	% within Discipline	100.0%	100.0%	100.0%	100.0%	

Additionally, when examining the results for discipline and (Q13) specific social media use, several notable differences appeared, as follows (see further supporting data in Table A1.8):

13 a) Blogs (e.g., Blogger, WordPress).

Overall, a relatively low percentage of students reported using blogs in their university learning (see Table 5.2 above), with only 17.7% of undergraduates reporting blog use. However, a higher percentage of students in Humanities & Social Sciences ($n = 60$, 25.3%) selected Yes for using blogs in their own university learning, as compared to the percentage in Natural

Sciences & Engineering ($n = 50$, 15.7%), with the lowest percentage reported from Health Sciences students ($n = 7$, 9.5%).

13 b) Wikis (e.g., Wikimedia).

Conversely, a higher percentage of students in Natural Sciences & Engineering ($n = 151$, 47.3%) selected Yes for using wikis in their own university learning, as compared to the percentage of students in Health Sciences ($n = 31$, 41.9%), with the lowest percentage of students in Humanities & Social Sciences ($n = 86$, 36.3%).

13 c) Google Apps (e.g., Google Calendar, Google Docs).

Students in Health Sciences reported higher use of Google Apps in their university learning ($n = 48$, 64.9%), as compared to those in Humanities & Social Sciences ($n = 135$, 57.0%), with the lowest reported use in Natural Sciences & Engineering ($n = 161$, 50.5%).

13 d) Image sharing (e.g., Flickr, Instagram, Pinterest).

Overall, a low percentage of students indicated image sharing (see Table 5.2), with only 17.8% of undergraduates reporting use of image sharing in their university learning. However, a higher percentage of image sharing was indicated in Humanities & Social Sciences ($n = 66$, 27.8%), as compared to Health Sciences ($n = 11$, 14.9%) and Natural Sciences & Engineering ($n = 43$, 13.5%).

13k) Video sharing (e.g., YouTube, Vine).

Overall, 43.2% of undergraduate students reported use of video sharing in their university learning (see Table 5.2 above). Within disciplines, a higher percentage of students in Health Sciences ($n = 43$, 58.1%) reported use of video sharing in their university learning as compared to the percentage of students in Humanities & Social Sciences ($n = 110$, 46.4%) and Natural Sciences & Engineering ($n = 132$, 41.4%).

13 m) Microblogs (e.g., Twitter).

Overall, a low percentage of students microblog (see Table 5.2), with only 14.3% of undergraduates reporting using microblogs in their university learning. However, a higher percentage of students in Humanities & Social Sciences ($n = 54$, 22.8%) reported using microblogs in their university learning as compared to the percentage of students in Natural Sciences & Engineering ($n = 37$, 11.6%), with the lowest percentage of students in Health Sciences ($n = 319$, 8.1%).

Discipline and Importance of Social Media

Regarding discipline and (Q14) student perceptions of SMTs as being important for learning, analysis showed notable differences for the following:

14 a) Blogs (e.g., Blogger, WordPress).

14 b) Wikis (e.g., Wikimedia).

14 c) Google Apps (e.g., Google Calendar, Google Docs).

14 d) Image sharing (e.g., Flickr, Instagram, Pinterest).

14 e) Social bookmarking (e.g., Delicious).

14 f) Social networking (e.g., Facebook, Google+).

14 m) Microblogs (e.g., Twitter).

Humanities & Social Sciences differences. Regarding their university learning, undergraduates in Humanities & Social Sciences ($n = 154$, $M = 2.92$, $SD = 1.09$) placed higher importance on blogs than students from the Health Sciences ($n = 209$, $M = 3.51$, $SD = 0.98$) and Natural Sciences & Engineering ($n = 55$, $M = 3.29$, $SD = 0.99$).

Humanities & Social Sciences versus Natural Sciences & Engineering.

Undergraduates in Humanities & Social Sciences ($n = 154$, $M = 2.37$, $SD = 1.07$) indicated

lower importance for wikis than undergraduates in Natural Sciences & Engineering ($n = 210$, $M = 2.00$, $SD = 1.02$). The Humanities & Social Sciences group also gave lower importance to wikis than those in Health Sciences ($n = 54$, $M = 2.15$, $SD = 1.17$). Furthermore, students in Humanities & Social Sciences ($n = 155$, $M = 3.06$, $SD = 1.08$) placed higher importance on image sharing than students in Natural Sciences & Engineering ($n = 211$, $M = 3.43$, $SD = 1.06$). The Health Sciences ($n = 54$, $M = 3.39$, $SD = 1.09$) group also indicated less importance for image sharing than those in Humanities & Social Sciences. The Humanities & Social Sciences ($n = 152$, $M = 3.45$, $SD = 0.87$) group indicated higher importance for social bookmarking than those in Natural Sciences & Engineering ($n = 208$, $M = 3.70$, $SD = 0.97$). Additionally, the Humanities & Social Sciences group indicated somewhat higher importance for social bookmarking than those in Health Sciences ($n = 55$, $M = 3.56$, $SD = 0.94$). Finally, those in Humanities & Social Sciences ($n = 153$, $M = 3.07$, $SD = 1.02$) indicated higher importance for microblogs than those in Natural Sciences & Engineering ($n = 205$, $M = 3.50$, $SD = 1.07$). The Humanities & Social Sciences group also indicated higher importance for microblogs than those in Health Sciences ($n = 53$, $M = 3.45$, $SD = 1.15$).

Health Sciences differences. Those in Health Sciences ($n = 56$, $M = 1.48$, $SD = 0.69$) indicated higher importance for Google Apps in their university learning compared to those in Natural Sciences & Engineering ($n = 214$, $M = 1.99$, $SD = 1.02$), and also differing somewhat from Humanities & Social Sciences ($n = 155$, $M = 1.79$, $SD = 0.90$). Additionally, those in Health Sciences ($n = 55$, $M = 2.20$, $SD = 1.03$) indicated higher importance for social networking than those in Natural Sciences & Engineering ($n = 213$, $M = 2.61$, $SD = 1.13$). The Health Sciences group also placed somewhat higher importance on social networking than those in Humanities & Social Sciences ($n = 155$, $M = 2.43$, $SD = 1.05$).

Discipline and Usefulness of Social Media

Regarding discipline and (Q15) student perceptions of social media characteristics as useful, analysis showed several notable differences, as follows:

15 c) Creating media to share online (e.g., pictures, videos, music).

15 e) Posting/Re-posting media or information found online (e.g., re-tweeting, sharing links).

15 f) Commenting on media or information found online.

15 g) Collaborating to create documents online (e.g., Google docs).

Humanities & Social Sciences versus Natural Sciences & Engineering. The Humanities & Social Sciences ($n = 152$, $M = 2.22$, $SD = 0.93$) group indicated higher agreement on the usefulness of creating media to share online compared to the Natural Sciences & Engineering ($n = 208$, $M = 2.48$, $SD = 1.04$) group. Again, the Humanities & Social Sciences group had similar agreement on the usefulness of creating media to share online as the Health Sciences ($n = 56$, $M = 2.23$, $SD = 0.97$) group. The Humanities & Social Sciences ($n = 150$, $M = 1.95$, $SD = 0.80$) group also showed higher agreement on the usefulness of posting/re-posting media or information found online over those in Natural Sciences & Engineering ($n = 207$, $M = 2.27$, $SD = 1.06$). The Humanities & Social Sciences group had similar agreement with the Health Sciences ($n = 55$, $M = 2.02$, $SD = 0.78$) group on the usefulness of posting/re-posting media or information found online. Furthermore, the Humanities & Social Sciences group showed higher agreement on the usefulness of commenting on media or information found online ($n = 152$, $M = 2.32$, $SD = 0.99$) compared to the Natural Sciences & Engineering ($n = 205$, $M = 2.60$, $SD = 1.00$) group. Undergraduates in Humanities & Social Sciences had

similar agreement with those in Health Sciences ($n = 55$, $M = 2.38$, $SD = 0.97$) on the usefulness of commenting on media or information found online.

Health Sciences differences. Regarding their university learning, those students from the Health Sciences ($n = 55$, $M = 1.25$, $SD = 0.48$) indicated higher agreement on the usefulness of collaborating to create documents online over those students from Natural Sciences & Engineering ($n = 207$, $M = 1.56$, $SD = 0.71$) or Humanities & Social Sciences ($n = 152$, $M = 1.53$, $SD = 0.74$).

Discipline and Making Meaning via Social Media

Regarding discipline and (Q16) student perceptions of social media characteristics to help make meaning, analysis showed several notable differences, as follows:

16 b) Building relationships with instructors (e.g., Facebook, LinkedIn).

16 c) Creating media to share online (e.g., pictures, videos, music).

16 d) Sharing information online (e.g., links to websites, articles).

16 e) Posting/Re-posting media or information found online (e.g., re-tweeting, sharing links).

16 f) Commenting on media or information found online.

Humanities & Social Sciences versus Natural Sciences & Engineering. For this question, all differences occurred between two disciplinary groups: Humanities & Social Sciences and Natural Sciences & Engineering. The Humanities & Social Sciences students ($n = 151$, $M = 2.48$, $SD = 1.06$) indicated higher agreement on making meaning of university learning by building relationships with instructors compared to those in Natural Sciences & Engineering ($n = 208$, $M = 2.77$, $SD = 1.10$). Regarding building relationships with instructors, the Humanities & Social Sciences group also differed from undergraduates in Health Sciences

($n = 54$, $M = 2.88$, $SD = 1.24$). Additionally, the Humanities & Social Sciences group ($n = 152$, $M = 2.29$, $SD = 0.92$) indicated higher agreement on making meaning by creating media to share online compared to the Natural Sciences & Engineering group ($n = 205$, $M = 2.60$, $SD = 1.11$). The Humanities & Social Sciences students also differed from undergraduates in Health Sciences ($n = 55$, $M = 2.42$, $SD = 1.03$).

Likewise, the Humanities & Social Sciences ($n = 152$, $M = 1.82$, $SD = 0.72$) group indicated higher agreement on making meaning by sharing information online as compared to the Natural Sciences & Engineering ($n = 206$, $M = 2.05$, $SD = 0.91$) group. However, the Humanities & Social Sciences and Health Sciences ($n = 55$, $M = 1.84$, $SD = 0.79$) means were closer. Again, the Humanities & Social Sciences ($n = 150$, $M = 2.14$, $SD = 0.86$) group indicated higher agreement on making meaning by posting/re-posting media or information found online, as compared to the Natural Sciences & Engineering ($n = 207$, $M = 2.52$, $SD = 1.05$) group. The Humanities & Social Sciences and Health Sciences ($n = 56$, $M = 2.30$, $SD = 0.97$) means also differed. Finally, the Humanities & Social Sciences ($n = 150$, $M = 2.42$, $SD = 1.03$) group indicated higher agreement on making meaning by commenting on media or information found online as compared to the Natural Sciences & Engineering ($n = 207$, $M = 2.73$, $SD = 0.99$) group. The Humanities & Social Sciences and Health Sciences ($n = 55$, $M = 2.56$, $SD = 1.10$) means differ here, as well.

Age and Ways of Making Meaning

When examining age and (Q10) ways of making meaning, several notable differences existed, as follows (see further supporting data in Table A1.12):

10 c) Interacting with different perspectives.

There was a higher mean age of students who indicated they interact with different perspectives ($n = 322, M = 22.78, SD = 5.09$) to make meaning of their university learning, as compared to the mean age of students who indicated they do not ($n = 325, M = 21.90, SD = 4.41$).

10 e) Applying your experience to real life (e.g., your career).

Analysis showed a higher mean age of students who indicated they apply experience to real life (e.g., your career) ($n = 428, M = 22.61, SD = 4.92$) to make meaning of their university learning, as compared to the mean age of students who indicated they do not ($n = 219, M = 21.81, SD = 4.44$).

10 g) Researching information.

There was a higher mean age of students who indicated Yes for researching information ($n = 319, M = 22.98, SD = 5.42$) when making meaning of their university learning, as compared to the mean age of students who indicated they do not ($n = 328, M = 21.71, SD = 3.95$).

Age and Individual versus Social Meaning Making

Regarding age and (Q11) making meaning individually versus socially, analysis showed no notable differences. The mean age was similar for those indicating they make meaning individually (personally) ($n = 292, M = 22.7, SD = 5.29$), with others (socially) ($n = 33, M = 21.5, SD = 4.33$), and both individually (personally) and with others (socially) ($n = 304, M = 22.1, SD = 4.35$).

Age and Social Media Use

In examining age and (Q12) general social media use, there was no notable difference in the mean age of students who reported they use social media ($n = 448, M = 22.2, SD = 4.53$) and students who reported they do not use social media ($n = 180, M = 23.0, SD = 5.41$) in their

university learning. Additionally, when examining age and (Q13) specific social media technologies used, there were no notable differences (for further supporting data, see Table A1.13).

Age and Perceptions of Social Media

Regarding age and (Q14) student perceptions of SMTs as important, (Q15) student perceptions of social media characteristics as useful, and (Q16) student perceptions of social media characteristics to help make meaning, Pearson correlations were conducted. Using Colton's (1974) criteria that correlations under 0.25 (or -0.25) have little or no relationship, none of these variables were strongly correlated (further supporting data is outlined in Tables A1.14, A1.15, and A1.16 in Appendix A).

Year of Study and Ways of Making Meaning

When examining year of study and (Q10) ways of making meaning, there were notable differences (see further supporting data in Table A1.9), in particular the following:

10 c) Interacting with different perspectives.

A somewhat higher percentage of students in (4) Fourth Year ($n = 104$, 57.5%) selected Yes for interacting with different perspectives to make meaning of their university learning, as compared to the percentage of students in other years, (1) First Year ($n = 59$, 43.7%), (2) Second Year ($n = 59$, 46.1%), and (3) Third Year ($n = 73$, 46.2%).

10 f) Putting your learning into context.

Here, a higher percentage of students in (4) Fourth Year ($n = 121$, 66.9%) selected Yes for putting learning into context to make meaning of their university learning, which was somewhat higher than the percentage of students in (2) Second Year ($n = 81$, 63.3%), and much higher

when compared with the percentage of students in (1) First Year ($n = 70, 51.9\%$) and (3) Third Year ($n = 81, 51.3\%$).

Year of Study and Individual versus Social Meaning Making

When examining year of study and (Q11) making meaning individually versus socially, responses were similar across years of study, though a lower percentage of students in first year in reported individual meaning making than in other years. For further supporting data, see Table 5.9 below.

Year of Study and Social Media Use

When examining year of study and (Q12) general social media use, responses were similar across years of study, with somewhat higher use in earlier years, as outlined in Table 5.8.

Table 5.8

General Social Media Use by Year of Study

			What year of study are you in?				
			1 st Year	2 nd Year	3 rd Year	4 th Year	Total
(Q12) Do you use social media in your own university learning?	Yes	Count	99	93	106	121	419
		% within What year of study are you in?	79.8%	73.2%	68.4%	68.4%	71.9%
	No	Count	25	34	49	56	164
		% within What year of study are you in?	20.2%	26.8%	31.6%	31.6%	28.1%
Total	Count	124	127	155	177	583	
	% within What year of study are you in?	100.0%	100.0%	100.0%	100.0%	100.0%	

Table 5.9

Making Meaning Individually Versus Socially by Year of Study

			What year of study are you in?				
			1 st Year	2 nd Year	3 rd Year	4 th Year	Total
(Q11) How do you most often make meaning ("make sense") of your university learning?	individually (personally)	Count	49	65	70	92	276
		% within What year of study are you in?	38.9%	51.2%	45.2%	52.3%	47.3%
	with others (socially)	Count	9	4	7	9	29
		% within What year of study are you in?	7.1%	3.1%	4.5%	5.1%	5.0%
	both individually (personally) and with others (socially)	Count	68	58	78	75	279
		% within What year of study are you in?	54.0%	45.7%	50.3%	42.6%	47.8%
Total	Count	126	127	155	176	584	
	% within	100.0%	100.0%	100.0%	100.0%	100.0%	
	What year of study are you in?						

However, when examining year of study and (Q13) specific social media use, several notable differences appeared (see further supporting data in Table A1.10):

13 d) Image sharing (e.g., Flickr, Instagram, Pinterest).

Here, a higher percentage of those in (1) First Year ($n = 39$, 28.9%) selected Yes for using image sharing in their university learning as compared to the percentage in (2) Second Year ($n = 16$, 12.5%), (3) Third Year ($n = 28$, 17.7%), and (4) Fourth Year ($n = 32$, 17.7%).

13 j) File sharing (e.g., Dropbox, Google drive, BitTorrent).

Conversely, a lower percentage of students in (1) First Year ($n = 48$, 35.6%) selected Yes for file sharing in their university learning, as compared to the percentage of students in (2) Second Year ($n = 66$, 51.6%), (3) Third Year ($n = 78$, 49.4%) and (4) Fourth Year ($n = 90$, 49.7%).

Year of Study and Importance of Social Media

Regarding year of study and (Q14) student perceptions of SMTs as important, analysis showed several notable differences for the following SMTs:

14 d) Image sharing (e.g., Flickr, Instagram, Pinterest).

14 f) Social networking (e.g., Facebook, Google+).

14 g) Social news sites (e.g., Reddit).

14 j) File sharing (e.g., Dropbox, Google drive, BitTorrent).

Differences between first and fourth year. For this question, all differences for importance of social media occurred between first year and fourth year of study, with differences for file sharing between first and third year, as well. Those in (1) First Year ($n = 93$, $M = 3.10$, $SD = 1.01$) placed higher importance on image sharing in their university learning compared to those in (4) Fourth Year ($n = 114$, $M = 3.54$, $SD = 1.07$). Regarding the importance of image sharing, students in (1) First Year placed similar importance on image

sharing as those in (3) Third Year ($n = 99$, $M = 3.16$, $SD = 1.13$), whereas (4) Fourth Year students gave similar importance as those in (2) Second Year ($n = 92$, $M = 3.40$, $SD = 1.08$). Similarly, those in (1) First Year ($n = 93$, $M = 2.23$, $SD = 0.82$) indicated higher importance for social networking in their university learning compared to those in (4) Fourth Year ($n = 114$, $M = 2.69$, $SD = 1.14$). Students in (2) Second Year ($n = 92$, $M = 2.47$, $SD = 1.19$) gave similar importance to social networking as those in (3) Third Year ($n = 102$, $M = 2.58$, $SD = 1.15$).

Likewise, those in (1) First Year ($n = 92$, $M = 2.95$, $SD = 1.08$) indicated higher importance for social news sites in their university learning compared to those in (4) Fourth Year ($n = 111$, $M = 3.35$, $SD = 1.08$). Those in (4) Fourth Year gave similar importance to those in (2) Second Year ($n = 91$, $M = 3.32$, $SD = 1.04$) and (3) Third Year ($n = 98$, $M = 3.28$, $SD = 1.02$). Finally, those in (1) First Year ($n = 92$, $M = 1.99$, $SD = 0.94$) indicated lower importance for file sharing in their university learning compared to those in (3) Third Year ($n = 101$, $M = 1.61$, $SD = 0.73$) and (4) Fourth Year ($n = 114$, $M = 1.63$, $SD = 0.85$). Additionally, those in (2) Second Year ($n = 91$, $M = 1.70$, $SD = 0.89$) gave somewhat lower importance as compared to (3) Third Year and (4) Fourth Year.

Year of Study and Usefulness of Social Media

Regarding year of study and (Q15) student perceptions of social media characteristics as useful, analysis showed several notable differences, as follows:

15 b) Building relationships with instructors (e.g., Facebook, LinkedIn).

15 c) Creating media to share online (e.g., pictures, videos, music).

Differences between first and fourth year. Those in (1) First Year ($n = 94$, $M = 2.51$, $SD = 1.03$) indicated higher agreement on the usefulness of building relationships with instructors, as compared to those in (4) Fourth Year ($n = 111$, $M = 2.95$, $SD = 1.15$). Regarding

building relationships with instructors, students in (1) First Year gave similar importance as those in (3) Third Year ($n = 100$, $M = 2.58$, $SD = 1.10$), whereas students in (2) Second Year ($n = 89$, $M = 2.78$, $SD = 1.13$) indicated somewhat lower importance. Results also showed differences between first and fourth year for collaborating to create documents online, with upper years indicating higher agreement on usefulness as compared to lower years: (4) Fourth Year ($n = 110$, $M = 1.43$, $SD = 0.70$), (3) Third Year ($n = 100$, $M = 1.40$, $SD = 0.60$), (2) Second Year ($n = 89$, $M = 1.57$, $SD = 0.80$), and (1) First Year ($n = 92$, $M = 1.63$, $SD = 0.67$).

Differences between third and fourth year. In their university learning, students in (3) Third Year ($n = 100$, $M = 2.14$, $SD = 0.95$) indicated higher agreement on the usefulness of creating media to share online than students in (4) Fourth Year ($n = 111$, $M = 2.54$, $SD = 1.00$). Those in (1) First Year ($n = 93$, $M = 2.30$, $SD = 0.89$) indicated similar agreement to those in (2) Second Year ($n = 89$, $M = 2.37$, $SD = 1.00$).

Year of Study and Making Meaning via Social Media

Regarding year of study and (Q16) student perceptions of social media characteristics to help make meaning of learning, analysis showed several notable differences, as follows:

16 b) Building relationships with instructors (e.g., Facebook, LinkedIn).

16 c) Creating media to share online (e.g., pictures, videos, music).

Differences between first, third, and fourth year. Here, differences for meaning making via social media also occurred between first year and fourth year of study, and also between those in third and fourth year. Those in (1) First Year ($n = 92$, $M = 2.48$, $SD = 1.05$) and in (3) Third Year ($n = 100$, $M = 2.54$, $SD = 1.15$) indicated higher agreement on making meaning of university learning by building relationships with instructors, as compared to those in (4) Fourth Year ($n = 109$, $M = 3.03$, $SD = 1.07$). Regarding building relationships with

instructors, students in (2) Second Year ($n = 89$, $M = 2.67$, $SD = 1.14$) indicated lower means than those in first and third year, but higher than fourth year. Also, those in (3) Third Year ($n = 100$, $M = 2.34$, $SD = 0.99$) indicated higher agreement on making meaning of university learning by creating media to share online, as compared to those in (4) Fourth Year ($n = 109$, $M = 2.72$, $SD = 1.08$). Students in (1) First Year ($n = 90$, $M = 2.37$, $SD = 1.00$) gave similar agreement as those in (2) Second Year ($n = 90$, $M = 2.34$, $SD = 1.04$).

Sex and Ways of Making Meaning

Regarding sex and ways of making meaning, a notably higher percentage of females than males indicated certain ways of making meaning, as follows:

- A higher percentage of females ($n = 263$, 59.5%) versus males ($n = 102$, 50.7%) indicated discussing with other people.
- A higher percentage of females ($n = 307$, 69.5%) versus males ($n = 118$, 58.7%) indicated applying experience to real life.
- A higher percentage of females ($n = 272$, 61.5%) versus males ($n = 104$, 51.7%) indicated putting learning into context.

In contrast, a higher percentage of males ($n = 146$, 72.6%) versus females ($n = 275$, 62.2%) reported meaning making by working through the process of figuring something out (e.g., solving a problem).

Sex and Individual versus Social Meaning Making

When examining descriptive results for sex and (Q11) making meaning individually or socially, a higher percentage of males ($n = 105$, 54.4%) indicated most often making meaning of their university learning individually (personally), as compared to the percentage of females ($n = 186$, 43.1%). Rather, females ($n = 223$, 51.6%) indicated most often making meaning of

their university learning both individually (personally) and with others (socially), as compared to males ($n = 78$, 40.4%).

Sex and Social Media Use

In examining sex and (Q12) general social media use, a higher percentage of females ($n = 326$, 75.5%) than males ($n = 121$, 63.0%) reported use of social media in their university learning. Furthermore, when examining the relation between sex and (Q13) specific social media use, a notably higher percentage of female students indicated use of specific SMTs in learning, as follows:

- A higher percentage of females ($n = 254$, 57.5%) versus males ($n = 93$, 46.3%) indicated using Google Apps.
- A higher percentage of females ($n = 245$, 55.4%) versus males ($n = 88$, 43.8%) indicated using social networking.
- A higher percentage of females ($n = 215$, 48.6%) versus males ($n = 76$, 37.8%) indicated using video sharing.

Sex and Importance of Social Media

In examining sex and (Q14) perceptions of SMTs as important, a notably higher percentage of males perceive specific SMTs to be important in their learning, as follows:

- Males ($n = 115$, $M = 1.91$, $SD = 1.10$) indicated higher importance than females ($n = 308$, $M = 2.25$, $SD = 1.04$) for wikis.
- Males ($n = 114$, $M = 2.44$, $SD = 1.20$) indicated higher importance than females ($n = 309$, $M = 2.70$, $SD = 1.01$) for VOIP and instant messaging.
- Males ($n = 112$, $M = 3.22$, $SD = 1.04$) indicated higher importance than females ($n = 301$, $M = 3.47$, $SD = 0.88$) for do-it-yourself networks.

Additionally, males ($n = 115$, $M = 1.91$, $SD = 1.03$) indicated somewhat higher importance than females ($n = 312$, $M = 2.07$, $SD = 0.97$) for video sharing in their learning.

Sex and Perceptions of Social Media

When examining sex and (Q15) perceptions of social media characteristics as useful, as well as (Q16) perceptions of social media characteristics to help make meaning, responses from males and females were similar for both questions. For Q16, there were only slight differences between sexes for tracking and managing your academic schedule, with somewhat lower agreement provided by males ($n = 110$, $M = 2.19$, $SD = 1.09$) as compared to females ($n = 307$, $M = 1.93$, $SD = 0.88$).

Individual versus Social Learning and Social Media Use

When examining (Q11) making meaning individually or socially and (Q12) general social media use, those students who most often make meaning of their learning both individually (personally) and with others (socially), and those who most often make meaning with others (socially), gave higher responses for using social media in their learning, as outlined in Table 5.10 below. When examining (Q11) making meaning individually or socially and (Q13) specific social media use, there were several notable differences, as follows (see further supporting data in Table A1.11):

13 b) Wikis (e.g., Wikimedia).

A lower percentage of students who indicated they most often make meaning of their university learning individually ($n = 112$, 38.2%) reported using wikis, as compared to the percentage of students who reported making meaning with others ($n = 18$, 54.5%) or both individually and with others ($n = 144$, 47.1%).

Table 5.10

General Social Media Use Related to Making Meaning Individually Versus Socially

		How do you most often make meaning ("make sense") of your university learning?			Total	
		individually (personally)	with others (socially)	both individually (personally) and with others (socially)		
Do you use social media in your own university learning?	Yes	Count	180	26	243	449
		% within How do you most often make meaning ("make sense") of your university learning?	61.9%	78.8%	79.7%	71.4%
	No	Count	111	7	62	180
		% within How do you most often make meaning ("make sense") of your university learning?	38.1%	21.2%	20.3%	28.6%
Total		Count	291	33	305	629
		% within How do you most often make meaning ("make sense") of your university learning?	100.0%	100.0%	100.0%	100.0%

13 c) Google Apps (e.g., Google Calendar, Google Docs).

Students who indicated they most often make meaning of their university learning individually ($n = 132, 45.1\%$) reported lower use of Google Apps when compared to those who make meaning of university with others ($n = 20, 60.6\%$), with the highest use of Google Apps reported by those who make meaning both individually and with others ($n = 198, 64.7\%$).

13 d) Image sharing (e.g., Flickr, Instagram, Pinterest).

A lower percentage of students who indicated most often making meaning of university learning individually ($n = 38, 13.0\%$) or with others ($n = 5, 15.2\%$) reported use of image sharing in university learning, as compared to the percentage of students who indicated most often making meaning of university both individually and with others ($n = 77, 25.2\%$).

13f) Social networking (e.g., Facebook, Google+).

A higher percentage of students who reported most often making meaning of their university learning both individually and with others ($n = 193, 63.1\%$) reported using social networking, as compared to those who reported making meaning of university with others ($n = 19, 57.6\%$) or individually ($n = 124, 42.3\%$).

13 g) Social news sites (e.g., Reddit).

Overall, a low percentage of undergraduates ($n = 68, 10.0\%$) reported using social news sites in their learning (see Table 5.2). However, a higher percentage of students who indicated they most often make meaning of their university learning both individually and with others ($n = 45, 14.7\%$) reported using social news sites, as compared to the percentage who reported making meaning of university with others ($n = 3, 9.1\%$) or individually ($n = 20, 6.8\%$).

13 h) VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp).

A higher percentage of students who indicated they most often make meaning of their university learning both individually and with others ($n = 105$, 34.3%) or with others ($n = 11$, 33.3%) reported using VOIP and instant messaging, as compared to the percentage of students who reported making meaning of university individually ($n = 55$, 18.8%).

13 j) File sharing (e.g., Dropbox, Google drive, BitTorrent).

A higher percentage of students who indicated they most often make meaning of their university learning with others ($n = 21$, 63.6%) or both individually and with others ($n = 170$, 55.6%) reported file sharing, as compared to the percentage who reported making meaning of university individually ($n = 116$, 39.6%).

13 k) Video sharing (e.g., YouTube, Vine).

A higher percentage of students who indicated they most often make meaning of their university learning both individually and with others ($n = 166$, 54.2%) or with others ($n = 16$, 48.5%) reported video sharing, as compared to the percentage who reported making meaning of university individually ($n = 111$, 37.9%).

13 l) Location-based applications (e.g., Foursquare, Google Maps).

Overall, a low percentage of undergraduates (13.0%) reported using location-based applications in their learning (see Table 5.2). However, a higher percentage of students who indicated they most often make meaning of their university learning both individually and with others ($n = 64$, 20.9%) reported using location-based applications, as compared to the percentage who reported making meaning of university with others ($n = 4$, 12.1%), with the lowest percentage from those who reported making meaning individually ($n = 20$, 6.8%).

13 m) Microblogs (e.g., Twitter), $X^2(2, n = 632) = 13.95$.

Though overall only 14.3% of students reported using microblogs (see Table 5.2) in their learning, a higher percentage of students who indicated they most often make meaning of their university learning with others ($n = 9$, 27.3%) or both individually and with others ($n = 59$, 19.3%) reported using microblogs, with the lowest percentage reported by those who make meaning individually ($n = 29$, 9.9%).

Ways of Making Meaning and Specific Social Media Use

Analyzing the responses for (Q10) ways of meaning making and (Q13) specific social media use revealed several relationships, as shown in Tables 5.11, 5.12, and 5.13 below.

Additionally, applying a Pearson correlation test for Q10 and Q13 totals revealed a fair degree of relationship (Colton, 1974) and statistical significance: $r(677) = 0.38$, $p < 0.001$.

Table 5.11

Ways of Making Meaning in University Related to Specific Social Media Use (Q13a-e)

Variables Examined	Specific Social Media (Q13a-e; <i>N</i> of valid cases = 679)									
	<i>n</i> (%)									
	Blogs		Wikis		Google Apps		Image sharing		Social bookmarking	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Gaining your own deep understanding (e.g., of a concept).	103 (85.8)	398 (71.2)	225 (82.1)	276 (68.1)	287 (81.8)	214 (65.2)	94 (77.7)	407 (72.9)	13 (86.7)	488 (73.5)
Saying something in your own words.	77 (64.2)	278 (49.7)	169 (60.9)	188 (46.4)	203 (57.8)	152 (46.3)	74 (61.2)	281 (50.4)	10 (66.7)	345 (52.0)
Interacting with different perspectives.	86 (71.7)	237 (42.4)	153 (55.8)	170 (42.0)	195 (55.6)	128 (39.0)	77 (63.6)	246 (44.1)	10 (66.7)	313 (47.1)
Discussing with other people.	86 (71.7)	282 (50.4)	184 (67.2)	184 (45.4)	221 (63.0)	147 (44.8)	81 (66.9)	287 (51.4)	13 (86.7)	355 (53.5)
Applying your experience to real life (e.g., your career).	88 (73.3)	343 (61.4)	189 (69.0)	242 (59.8)	264 (75.2)	167 (50.9)	98 (81.0)	333 (59.7)	12 (80.0)	419 (63.1)
Putting your learning into context.	82 (68.3)	300 (53.7)	176 (64.2)	208 (50.9)	224 (63.8)	158 (48.2)	82 (67.8)	300 (53.8)	9 (60.0)	373 (56.2)
Researching information.	70 (58.3)	251 (44.9)	150 (54.7)	171 (42.2)	182 (51.9)	139 (42.4)	60 (49.6)	261 (49.6)	9 (60.0)	312 (47.0)
Seeking help from others.	60 (50.0)	197 (35.2)	136 (49.6)	121 (29.9)	163 (46.4)	94 (28.7)	60 (49.6)	197 (35.3)	11 (73.3)	246 (37.0)
Working through the process of figuring something out (e.g., solving a problem).	79 (65.8)	347 (62.1)	198 (72.3)	228 (56.3)	246 (70.1)	180 (54.9)	84 (69.4)	342 (61.3)	10 (66.7)	416 (62.7)

Table 5.12

Ways of Making Meaning in University Related to Specific Social Media Use (Q13f-i)

Variables Examined	Specific Social Media (Q13f-i; <i>N of valid cases = 679</i>)							
	Social networking		Social news sites		VOIP and Instant messaging		Do-it-yourself networks	
	Yes	No	Yes	No	Yes	No	Yes	No
Gaining your own deep understanding (e.g., of a concept).	273 (81.3)	228 (66.5)	53 (77.9)	448 (73.3)	136 (79.5)	365 (71.9)	9 (69.2)	492 (73.9)
Saying something in your own words.	201 (59.8)	154 (44.9)	42 (61.8)	313 (51.2)	108 (63.2)	247 (48.6)	7 (53.8)	348 (52.3)
Interacting with different perspectives.	193 (57.4)	130 (37.9)	43 (63.2)	280 (45.8)	107 (62.6)	216 (42.5)	9 (69.2)	314 (47.1)
Discussing with other people.	224 (66.7)	144 (42.0)	43 (63.2)	325 (53.2)	118 (69.0)	250 (49.2)	9 (69.2)	359 (53.9)
Applying your experience to real life (e.g., your career).	251 (74.7)	180 (52.5)	62 (91.2)	369 (60.4)	137 (80.1)	294 (57.9)	12 (92.3)	419 (62.9)
Putting your learning into context.	220 (65.5)	162 (47.2)	47 (69.1)	335 (54.8)	114 (66.7)	268 (52.8)	11 (84.6)	371 (55.7)
Researching information.	178 (53.0)	143 (41.7)	42 (61.8)	279 (45.7)	101 (59.1)	220 (43.3)	7 (53.8)	314 (47.1)
Seeking help from others.	170 (50.6)	87 (25.4)	30 (44.1)	227 (37.2)	92 (53.8)	165 (32.5)	7 (53.8)	250 (37.5)
Working through the process of figuring something out (e.g., solving a problem).	233 (69.3)	193 (56.3)	51 (75.0)	375 (61.4)	131 (76.6)	295 (58.1)	9 (69.2)	417 (62.6)

Table 5.13

Ways of Making Meaning in University Related to Specific Social Media Use (Q13j-m)

Variables Examined	Specific Social Media (Q13j-m; <i>N of valid cases</i> = 679)							
	File sharing		Video sharing		Location-based applications		Microblogs	
	Yes	No	Yes	No	Yes	No	Yes	No
Gaining your own deep understanding (e.g., of a concept).	253 (82.1)	248 (66.8)	236 (80.5)	265 (68.7)	69 (78.4)	432 (73.1)	76 (78.4)	425 (73.0)
Saying something in your own words.	188 (61.0)	167 (45.0)	176 (60.1)	179 (46.4)	56 (63.6)	299 (50.6)	62 (63.9)	293 (50.3)
Interacting with different perspectives.	180 (58.4)	143 (38.5)	169 (57.7)	154 (39.9)	64 (72.7)	259 (43.8)	67 (69.1)	256 (44.0)
Discussing with other people.	211 (68.5)	157 (42.3)	195 (66.6)	173 (44.8)	66 (75.0)	302 (51.1)	72 (74.2)	296 (50.9)
Applying your experience to real life (e.g., your career).	227 (73.7)	204 (55.0)	215 (73.4)	216 (56.0)	76 (86.4)	355 (60.1)	74 (76.3)	357 (61.3)
Putting your learning into context.	205 (66.6)	177 (47.7)	186 (63.5)	196 (50.8)	58 (65.9)	324 (54.8)	62 (63.9)	320 (55.0)
Researching information.	162 (52.6)	159 (42.9)	154 (52.6)	167 (43.3)	54 (61.4)	267 (45.2)	59 (60.8)	262 (45.0)
Seeking help from others.	148 (48.1)	190 (29.4)	139 (47.4)	118 (30.6)	47 (53.4)	210 (35.5)	49 (50.5)	208 (35.7)
Working through the process of figuring something out (e.g., solving a problem).	219 (71.1)	207 (55.8)	205 (70.0)	221 (57.3)	64 (72.7)	362 (61.3)	64 (66.0)	362 (62.2)

Summary of Quantitative Findings

Several important findings are demonstrated within the survey results. As shown through the Pearson correlation, there is a relationship between ways of making meaning and specific SMT use that provides important context for social media use. Furthermore, there are demonstrable differences between disciplines, including differences for ways of making meaning and for specific (but not general) social media use. There are also differences between disciplines regarding student perceptions of social media as being important, as having useful characteristics, and as helping to make meaning of university learning. Such differences also exist when accounting for years of study, ways of making meaning, and specific social media uses and perceptions. Regarding age, while there are no notable differences found for either general or specific social media use or perceptions, there are differences for ways of making meaning. Additionally, differences between sexes are evident for several variables related to making meaning and perceptions and uses of social media technologies. For independent and social learning, there are differences for making meaning individually versus making meaning socially, as well as for variables connected to general and specific social media use. The implications of these results as they interface with the overall qualitative and quantitative findings are discussed and demonstrated in the subsequent chapter.

Chapter 6

Implications of and Recommendations for Research Findings

The following discussion examines the findings from both the qualitative and quantitative results. Following Morse and Niehaus (2009) and Creswell and Plano Clark (2011), this discussion chapter serves as the interface for the qualitative and quantitative findings, integrating the components of both phases and summarizing overall implications. Together, the findings from the qualitative and quantitative phases of the research study illustrate the many ways in which undergraduate learners from different disciplines view social media to be a meaningful part of their university learning (*RQ1*), as well as the characteristics of social media that undergraduate learners see as contributing to meaning making during their university learning (*RQ2*).

The qualitative and the quantitative findings present a rich picture of why and how ways of making meaning and specific social media use are often related, and illustrate how contextual factors, such as discipline, sex, and year of study, play a role in understanding social media uses and perceptions in undergraduate learning. Since students themselves identify social media as a double-edged sword with the potential to both help and hinder their learning, their choices to use (or not use) SMTs often depend on the characteristics, purpose, and contexts at hand. When taken together, these qualitative and quantitative findings illustrate not only *how* students most often use social media, but *why* students see social media as important, useful, or helpful in making meaning of their university learning.

Students' Conceptions of Meaning Making

Although ways of making meaning are often tacitly held and therefore not easy to articulate, students who participated in this study offered many thoughtful reflections on the

importance of meaning making. As one undergraduate interview participant affirmed, “I think it’s one of the main goals of getting a university education is to make meaning of the world around you.” During the interview phase, students indicated nine core categories of meaning making in university learning, including gaining one’s own deep understanding (e.g., deeply understanding a concept), applying experience gained to real life (such as a career), and working through a problem as ways of making meaning university learning. The presence of these themes was confirmed during the survey phase (see Table 5.1 in Chapter 5). As noted in the introduction, few existing studies have provided a specific analysis of the ways in which undergraduates articulate and understand meaning making in their learning, especially regarding their use of SMTs. Student perceptions of meaning making – specifically, how undergraduate students define and view this process in their learning and when using SMTs – is a key contribution of the study.

Social Media and Ways of Making Meaning

The qualitative and quantitative findings demonstrate an important connection between ways of making meaning and specific SMTs (see chapters 4 and 5), further reinforcing social constructivist connections between social interactions and meaning making in university learning. While the findings reveal that social media use in general was relatively constant across participants, delving into particular ways of making meaning and specific SMTs used in undergraduate learning illustrates several key relationships. In particular, as outlined in chapter 5, several connections and associations occurred between the following ways of meaning making and social media.

Social Media Associations

The connections outlined in the quantitative results in chapter 5 bring forth a range of social media for making meaning, presenting a much fuller picture of the nature and purpose of SMTs in learning than can be witnessed in usage data alone. There were associations between specific SMTs used and ways of making meaning, with the most popular SMTs – Google Apps, social networking, file sharing, video sharing, and wikis – also having the highest number of connections with specific ways of making meaning across all activities. Yet, while wikis were the fifth most used SMT as reported by 40.4% of students (see Table 5.2 in Chapter 5), the usage statistics alone did not reveal the ways that wikis are connected to all the of ways of making meaning in university learning outlined (see Table 5.11). Here, we can see that those students who use wikis also indicated that they engage in a diverse range of meaning making activities, from discussing with others to putting learning into context and solving a problem, etc.

Further insights into less popular SMTs are also revealed when considering meaning. For instance, VOIP and instant messaging were the sixth most used SMT, reported by only 25.2% of students (see Table 5.2). However, students who used VOIP and instant messaging in their learning also indicated that they engaged in the entire range of meaning making activities listed, including researching information, seeking help from others, saying something in your own words, applying your experience to real life (e.g., your career), and so on (see Table 5.12). There are connections for a range of meaning making activities related to other less frequently used SMTs, including image sharing, blogs, microblogs, location-based applications, and social news sites. Unsurprisingly, those SMTs that had low use – social bookmarking (2.2%) and do-it-yourself networks (1.9%) – also had fewer associations with meaning making activities. For the small percentage of students who did use these technologies, instead of a range of meaning

making activities there were one or two specific meanings present, with connections between social bookmarking and seeking help from others, as well as do-it-yourself networks and applying experience and putting learning into context (see Tables 5.11 and 5.12). These results were consistent with the interview results, where no students indicated use of or familiarity with do-it-yourself networks, and very few with social bookmarking.

Meaning Making Associations

As the Pearson correlation demonstrates (see chapter 5), there is a relationship between the ways of making meaning and specific social media technologies used. The associations between particular ways of making meaning and specific SMTs also revealed interesting patterns in the meaning making activities outlined. For example, regarding gaining a deeper understanding (e.g., of a concept), the most connections existed with blogs, wikis, Google Apps, social networking, file sharing, and video sharing, as well as VOIP/instant messaging (see Tables 5.11, 5.12, and 5.13). Conversely, there are few or no connections between gaining a deeper understanding and use of image sharing, social news sites, location-based applications, or microblogs. These findings are consistent with the interviews, where many students stated that the limitations or specific functions of tools such as Twitter, Instagram, and Google Maps meant that it was difficult to gain a deep understanding from using them. While many students indicated that these SMTs did serve a useful purpose (e.g., Google Maps was useful for finding places), their design and functions were often viewed as not helping to build deep conceptual understandings or for university studies. Yet the opposite is true for other purposes such as applying experiences to real life (e.g., a career), researching information, and interacting with different perspectives, where associations do exist with microblogs and location-based

applications. This reinforces what several students articulated during the interviews: perceptions and uses of social media are associated with the meaning, context, and purpose at hand.

Individual and Social Learning

Another significant contribution of this study is the findings on student perceptions of learning individually (personally) versus socially (with others) that reflect social constructivist ideas that meaning is created via interactions between both individual (internal) and social (external) and levels. Although digital native proponents have argued that Net generation students are connected, team-oriented, collaborative multitaskers (Frاند, 2000; Howe & Strauss, 2000; Oblinger, 2003; Prensky, 2001b; Tapscott, 1998), a majority of students indicated that they most often make meaning of their learning either individually or through a combination of individual and social learning. As outlined in Chapter 5, a notable finding of this study is that despite continued digital native claims and the prominence of both collaborative learning and technology strategies, an overwhelming 94.8% ($n = 599$) of students indicated that they make meaning of their university learning either individually or through a combination of individual and social learning. In contrast, only 5.2% ($n = 33$) of undergraduate students indicated that they make meaning of their university learning solely with others (socially). Clearly, while social interactions are important for a large percentage of undergraduate students, for many students there remains an important role for making meaning individually, a finding fully in alignment with social constructivist learning theories emphasizing the role of both individual and social meaning making processes through internal-external interactions.

Notably, the survey revealed that 71.5% ($n = 451$) of respondents do use social media in their own university learning. Contrary to Kennedy et al.'s (2007) earlier research showing social media use for collaboration and self-publishing in this generation to be quite low, this study

demonstrates that today a large number of undergraduate students do use social media as a part of their own learning. The interview results show that social media in learning is not only for social interaction and online collaboration, but also for information finding and individual study or review. The interviews results also illustrate that students commonly value online file sharing and document collaboration tools, social networking via SMTs, and building their understanding of core concepts by viewing online videos and wikis, etc. This finding is confirmed by survey results showing the most commonly used SMTs are those enabling collaboration with peers (see Table 5.2). Online file collaboration and sharing (e.g., the institutional version of Google Docs, Dropbox, etc.) and social networking technologies (e.g., Facebook) are the top SMTs students use for collaborating in their university learning. However, video sharing services such as YouTube (and also the Khan Academy) and wikis (e.g., Wikipedia) are also a top choice, with interviews revealing that such SMTs are used more for individual learning and review of concepts.

Social Media and Individual versus Social Learning

Examining the importance of individual and social learning stemmed not only from components of constructivist theory, but also from interview data pointing to the importance of both individual (e.g., student-content) and social (e.g., student-student) interactions. For example, while connecting and communicating for collaboration is clearly a key part of using social media, as students such as Jessica stated: “I use more of... the social media that’s individually accessed and individually experienced.” In order to further understand these themes from the interviews, the survey data shed further light on individual (personal learning) and social (learning with others) as they related to social media in university learning.

An interesting connection emerges between individual versus social learning preferences

and general social media use. Those students indicating they most often involve others to make meaning of their learning – 78.8% with others (socially) alongside 79.7% individually (personally) and with others (socially) – also gave higher responses indicating use of social media in their university learning, as illustrated in chapter 5. Therefore, students who (co)construct meaning of their learning by involving others often use social media in their learning to do so.

The relationship between social media and socially (co)constructed meaning in learning is also evident when considering specific social media use. Students who indicated they prefer to make meaning of their university learning *both* individually and with others, which most fully reflects constructivist notions of solidifying knowledge through internal-external interactions, also reported the highest overall social media use. These participants indicated high use of social media for information seeking and sharing activities, including image sharing, social news, location-based applications, and microblogs, as well as for activities for organizing and connecting including Google Apps, social networking, VOIP/instant messaging, and video sharing. In contrast, those who indicated making meaning primarily with others (socially) reported high use of social media for activities related to organizing and connecting (e.g., VOIP/instant messaging, file sharing), and for building understanding (e.g., wikis).

Conversely, students who indicated most often making meaning of their learning individually (personally) also indicated lower use of a range of social media in their learning, including wikis, Google Apps, image sharing, social networking, social news sites, VOIP/instant messaging, file sharing, video sharing, location-based applications, and microblogs. When comparing the results from both the quantitative and qualitative data, it is clear that students who indicated a preference to make meaning individually also indicated lower use of social media. A

key finding here is that a large percentage of those students who prefer to make meaning of their learning individually and also use social media less often, not only for student-student interactions but also for student-content interactions. Therefore, these individual preferences and the related usage information should be taken into account when making recommendations for social media in undergraduate learning.

The ways in which undergraduate students indicated they most often make meaning – either individually, socially, or via a combination of the two – is clearly reflected in their social media choices and uses for their university learning. The particular implications of individual or social ways of making meaning are further reflected regarding discipline and demographic characteristics, discussed in greater detail in the following sections.

Demographic Differences

Many post-secondary institutions are members of EDUCAUSE, including the University of Alberta. Since EDUCAUSE and ECAR recommendations and publications are followed at the University of Alberta and elsewhere, it is valuable to compare the results of this study with other recent studies from those organizations. Indeed, since digital native claims are often based on demographic characteristics (e.g., age), it is necessary to examine demographic claims and trends in detail, especially since the findings of this study differ from previous research, such as Kennedy et al.'s (2008) showing “no role, gender or age effects” (p. 484) for social media activities.

Recent ECAR results show some similarities to, but also importance differences from, the findings in this study. For instance, ECAR's 2014 results show that undergraduate students indicated a larger number of “use it less” ratings than “use it more” ratings (Dahlstrom & Bichsel, 2014, pp. 11-12) for learning via social media, with fewer than 50% of respondents

indicating they use social media as a learning tool. However, a much higher percentage (71.5%) of respondents in this study indicated they do use social media in their university learning. The results of this study more closely reflect recent Pew Research Center (n.d.) research showing that “as of January 2014, 74% of online adults use social networking sites” (para. 1).

Age and social media. It is important to consider the results regarding age, particularly since age-based claims have informed, and continue to appear in, much of the discourse on so-called digital native students and their technology needs. This study tested variables regarding general and specific social media use as connected to age, as well as perceptions on the importance and usefulness of social media in learning, and found no notable differences related to age (see Appendix A). Regarding age and student perceptions of SMTs as being important, as well as student perceptions of social media characteristics as useful or helping to make meaning of university learning, the Pearson correlations reveal no strong relationships between these variables (see Tables A1.14, A1.15, and A1.16 in Appendix A).

The results of this study confirm those from ECAR showing that “assumptions or stereotypes about these demographic factors (e.g., younger adults are more tech inclined than older adults) are not supported by our data” (p. 9). However, it is important to also consider the Pew Research Center’s (n.d.) 2014 data showing that overall use of social networking sites differs significantly according to age, with higher use for those 18-29 (89%) and 30-49 (82%) (digital native age groups), and lower use for those 50-64 (65%) and 65+ (49%) (digital immigrant age groups). Comparison of these studies points to similarities in responses overall for technologies in undergraduate learning – mainly, that there is no evidence that social media perceptions and uses, as well as technology inclination, differ dramatically based on age – as compared to broader differences for digital native and immigrant age groups’ specific use of

social networking sites overall. For those concerned with social media in higher education, age and digital native claims should not be seen as a primary, determining factor; rather, context and affordances should be considered.

Age and meaning making. While there are no notable differences found between age and individual versus social meaning making, there are several notable differences for age regarding particular ways of making meaning in university learning. When taking into consideration both the qualitative and quantitative findings, some interesting differences emerge. For example, there are differences in the mean age of students who indicated that they use social media to interact with different perspectives, who apply experience to real life (e.g., your career), and who research information to make meaning of learning. Here, when considering interview evidence showing that students believe they develop over time, a higher mean age may indicate that as students mature, these ways of making meaning become a more important part of their university learning. In conjunction with the students' progression through university, as tracked by year of study results (discussed below), the qualitative and quantitative results reveal that as students mature and move through their undergraduate programs into upper years, they gain more exposure to, and place greater importance on, different perspectives and real life contexts (such as their profession or career) they will face as they graduate. Given that this study was conducted at a research-intensive university, the importance of research for making meaning of learning as students progress through their programs aligns with the University of Alberta's mandate to foster research at all levels, and therefore are not entirely surprising. As noted in the concluding part this chapter, future research should explore whether these ways of making meaning hold true elsewhere, such as teaching-focused institutions or technical institutes.

Sex and social media. The 2014 ECAR results do not show a large difference in demographic variables, such as sex, for technology inclination (p. 9). Contrary to other recent ECAR findings, the results of this study do show differences between sexes, with undergraduate females (75.5%) indicating higher use of social media than males (63.0%). Though the findings in this study again differ from ECAR, they do mirror the Pew Research Center's (n.d.) findings from 2013 showing that a higher percentage of women (72%) use social networking sites compared to men (62%), and also reflect similar findings from Canadian statistics showing that women are "significantly more likely than men to visit social networking sites daily" (Dewing, 2013, p. 2). In addition to female students indicating a higher use of social media for learning in general, this study also shows that females indicated that they are more likely to use specific social media in their learning, particularly SMTs that afford organizing and connecting activities, such as Google Apps, social networking, and video sharing.

Sex and meaning making. The reasons explaining why females are more likely to report use of social media for university learning in general, and specifically social collaboration and communication technologies for learning that align with organizing and connecting affordances, are perhaps best illuminated in differences between sexes regarding how they most often make meaning of their university learning. Females indicated a higher preference for making meaning both individually (personally) and with others (socially), whereas males indicated higher preference for making meaning individually (personally). Since a higher percentage of females reported making meaning by discussing with other people, applying experience to real life, and putting learning into context, and the qualitative and quantitative findings show important connections between ways of making meaning and this specific social media use, it is reasonable to make the association between these goals and social media choices (e.g., using social

networking for discussion). Additionally, there are some differences between males and females for characteristics of social media that help to make meaning of university learning, with lower agreement from males versus females for tracking and managing their academic schedules.

The findings on differences between the sexes regarding SMTs should also be viewed in conjunction with information on the sexes in disciplines. The quantitative findings on SMTs are mirrored in interview examples where students – particularly in cohort-learning programs, such as those within health disciplines that have a higher percentage of female students (The Association of Universities and Colleges Canada, 2011) – described the ways in which social media, and particularly Facebook, is used for applying, sharing, and discussing shared experiences through their status updates, messages, and even memes. Participants from the health sciences, a disciplinary category that has a higher percentage of female undergraduates, with 65% in Pharmacy and Pharmaceutical Sciences, 57% in Medicine and Dentistry, and 90% in Nursing in 2014/15 (University of Alberta Data Warehouse, personal communication, October 13, 2015), described in their interviews the importance of their Google calendars for both personal and shared purposes.

Overall males indicated using such SMTs for learning less frequently. However, whereas females indicated *use* of these certain SMTs, males gave higher importance for SMTs such as do-it-yourself networks, VOIP/instant messaging, video sharing, and wikis. A higher percentage of male versus female students reported making meaning by working through the process of figuring something out (e.g., solving a problem), and there are overall connections between ways of making meaning and specific social media use, so it is also reasonable to make an association between the goal of problem-solving and these social media choices (e.g., using wikis, VOIP/instant messaging, and videos for solving a problem).

These findings also appear within the interviews, especially those provided by students within Natural Sciences & Engineering. Several students noted the connection between problem-solving and wayfinding and, for instance, the choice to use Wikipedia. First year Science student Dorothy noted using Wikipedia to help find “step one.” While notions of wayfinding have originated from orienting and navigating one’s self in a physical space, more recently wayfinding has been used to describe the process of orientation and navigation in online educational spaces (e.g., Siemens, 2011; Wang, Chen, & Anderson, 2014). To be clear, rather than viewing wayfinding as a part of other theories (e.g., Siemens’ connectivist perspective), the student viewpoints within this study instead demonstrate that wayfinding is well explained within overall constructivist (and, perhaps related theories, such as symbolic interactionist) understandings of meaning making and interactions as a part of learning. While it is neither the intention nor within the scope of this study to discuss wayfinding and related constructivist notions of symbolic interactionism in detail, this is certainly an area for future study (as discussed in the concluding section, below), since here the activity of wayfinding using social media appears to be well explained via social constructivism and related student descriptions in the interviews of their information and help seeking processes, often using social media as a starting place to determine a direction for their learning.

The value of knowing why and how different students shape their learning and meaning making processes in university – individually and socially, choosing to use social media or not, etc. – is that it allows for further understanding of particular social media choices and contexts that go beyond usage statistics alone. Hence, while there were generally no differences between males and females regarding usefulness and meaning making via social media, we can see that

other important differences regarding specific aspects of meaning making, as well as social media choices for university learning in conjunction with disciplinary context, do exist.

Social media and year of study. Although there are no large differences in the percentages reported between undergraduate years regarding general social media use, a somewhat higher percentage of students in first and second year indicated that they use social media in their university learning compared to third and fourth year students. Here again, some notable differences also appear for specific social media use and perceptions according to year of study. For specific social media use, students entering university show differences from those near the end of their degrees. Students in first year indicate greater *use* of image sharing (e.g., via Pinterest, Instagram) in their learning, as well as placing a greater *importance* for image sharing via social media. This is consistent with recent findings from Duggan, Ellison, Lampe, Lenhart, and Madden (2015a, 2015b) at the Pew Research Center, showing growing use of these social media from 2013 to 2014, especially growing in young adult use of Instagram (37% to 53%) and Pinterest (27% to 34%). It is therefore not surprising to see some differences between students in earlier years of study as compared to those in later years.

Conversely, students in their first year (35.6%) reported lower use of file sharing when compared those in second (51.6%), third (49.4%), and fourth year (49.7%). First year students also placed less importance on file sharing as compared to upper undergraduate years in their third and fourth year. Instead, first year students placed greater importance on using social networking and social news, indicating that they are connecting and building networks and relationships. This implies that while students in first year are connecting to the university community via Facebook friends and newsfeeds, as they progress through their programs, students increasingly focus more on collaborative technologies such as those for file sharing

(e.g., the institutionally-supported Google Drive). The results also show differences between first and fourth year students' use of SMTs for collaborating to create documents online, while students in upper years indicated higher agreement on usefulness versus lower years: (4) Fourth Year ($M = 1.43$), (3) Third Year ($M = 1.40$), (2) Second Year ($M = 1.57$), and (1) First Year ($M = 1.63$).

As the interview results show, lower levels of file sharing use for first year students is likely reflective of larger first-year class sizes, where collaborative learning in a new environment is less familiar and can be more difficult. As students progress through their programs they become more familiar with institutionally supported tools (such as Google Apps) and increasingly experience smaller class sizes in upper years of their studies. This leads to more opportunities for working in groups, and establishing their university networks. The interviews reveal that there is greater need for information sharing and collaborative technologies in upper levels, as well as increased awareness and familiarity with such mechanisms, and this developmental process is reflected in both the qualitative and quantitative results.

When rating their perceptions of social media, the greatest differences for both usefulness and making meaning also appear between first year and fourth year students. For instance, first year students indicate a higher agreement on usefulness ($M = 2.51$) and meaning making ($M = 2.48$) via social media by building relationships with instructors, as compared to fourth year students. The interviews reveal reasons why this is the case, such as the students' own development. Whereas first year students often look to instructors (as they did to their high school teachers) for guidance, as students progress through their programs and develop confidence in their own knowledge and skills, they generally depend less on instructors. Indeed, the data demonstrate that making meaning by building relationships with instructors was given

lower agreement by upper year students: (Second Year $M = 2.67$; Third Year $M = 2.54$; and Fourth Year $M = 3.03$). This is perhaps best explained by student examples in the interviews noting the value and necessity of developing their own information and media literacies, and developing and applying their own knowledge and skills by becoming independent learners.

Meaning making and year of study. Consistent with the results for age and meaning making, there are also differences between first, third, and fourth years regarding ways of making meaning in university. For individual versus social ways of making meaning, a higher percentage of those in first year indicated making meaning individually, as compared to upper years. And, students in fourth year placed greater importance on interacting with different perspectives and putting their learning into the contexts they will see upon graduating. Students in fourth year also indicated lower agreement for making meaning by building relationships with instructors, reflecting overall themes in the qualitative and quantitative results regarding the importance of developing their own skills and knowledge, becoming an independent learner and potential social media contributor by year four. It not entirely apparent why students in third year indicated higher agreement on making meaning of university learning by creating media to share online, as compared to those in fourth year, and so this is an area for future research.

Investigating Disciplinary Differences

When examining overall student responses for making meaning of their university learning (either individually, socially, or via a combination) according to discipline, meaning making does not differ (see Table 5.6). However, when examining the question of disciplinary context and meaning making in greater depth, several important disciplinary differences between specific ways of making meaning emerge.

Discipline and Meaning Making

When compared to other disciplines, a higher percentage of students in Humanities & Social Sciences reported making meaning of their university learning by interacting with different perspectives. Furthermore, a higher percentage of students in Humanities & Social Sciences and in Health Sciences indicated making meaning by applying their experience to real life and putting learning into context compared to those in Natural Sciences & Engineering. Finally, in contrast to the other disciplines, students in Natural Sciences & Engineering gave higher responses the use of SMTs for figuring something out (e.g., solving a problem) to make sense of their learning. These findings are confirmed by examples revealed by students during the interviews, such as the ways they use social media for disciplinary-specific purposes, such as finding or sharing resources related to disciplinary concepts or skills.

Social Media and Disciplinary Context

When examining overall social media use according to discipline, responses indicating social media use for learning generally are similar across disciplines (see chapter 5). However, in investigating disciplinary context and specific SMTs further, there are several important ways in which the use of specific SMTs differs according to discipline. The following section details the implications of disciplinary differences in students' social media perceptions and use.

Health Sciences distinctions. Students in the health sciences are distinct from those in other disciplines regarding their perceptions and uses of social media for learning. A high percentage of those in Health Sciences indicated use of Google Apps and video sharing compared to other disciplines, and those in health disciplines also place a higher importance on Google Apps in their learning. When comparing results for health science students' responses for ways of making meaning, there is a connection between meaning making and social media use in

the discipline. As outlined in the quantitative results, Google Apps and video sharing are connected with the ways of making meaning indicated by health science students, specifically as they apply their experience to real life and put their learning into context. The interviews illustrate this further, as evidenced by student descriptions of using videos to study applications of medical techniques or procedures.

When compared to other disciplines, students in the health sciences indicated a higher importance of social networking in their learning, as well as higher agreement regarding the usefulness of collaborating to create documents online. There is also a relationship between social networking and applying experience with putting learning into context, and this came through in interview examples from these students. For example, many Health Sciences students discussed their collaborative learning within the context of their program's overarching context-based learning paradigm. Further implications related to students in the health sciences within cohort-based learning programs are discussed below.

Humanities & Social Sciences distinctions. A higher percentage of students in Humanities & Social Sciences indicated their use of blogs, image sharing, and microblogs compared to the percentage of students in other disciplines. Here again we find that these same SMTs relate to the ways of making meaning indicated by students in the Humanities and the Social Sciences. Specifically, there are connections between the specific SMTs of blogs and image sharing and ways of making meaning by interacting with different perspectives, applying experience to real life, and putting learning into context. There is also a connection between use of microblogs and interacting with different perspectives and applying experience to real life. Such relationships are evident in interview examples related to news, socio-political and social

justice issues, such as the riots in the Ukraine, or seeing different perspectives; for example, perspectives related to topics of English or Sociology.

Natural Sciences & Engineering distinctions. Students within Natural Sciences & Engineering disciplines indicated higher use of wikis compared to other disciplines. As with other disciplinary connections, these SMTs relate to the ways of making meaning indicated by students in natural science and engineering fields. Specifically, there is an association between wikis and working through the process of figuring something out (e.g., solving a problem). This was further highlighted in student interviews, when student mentioned examples of wayfinding when starting a lab report, finding formulas, and other disciplinary activities.

Differences between Humanities and Sciences. Overall, the results show consistent differences between Humanities & Social Sciences and Natural Sciences & Engineering groups. When asked whether social media is (Q14) important, (Q15) useful, or (Q16) helpful in making meaning in university learning, the largest overall differences occurred between these two disciplinary categories. For instance, compared to Natural Sciences & Engineering, Humanities & Social Sciences students placed higher importance on the same SMTs they reported frequently using: blogs, image sharing, and microblogs. These students also indicated greater importance for social bookmarking. Likewise, compared to the Humanities & Social Sciences, students in Natural Sciences & Engineering placed a higher importance on wikis in their learning.

The reasons behind such differences between these two disciplinary groups are further revealed in responses regarding social media characteristics as being useful and helping to make meaning of university learning. For instance, those in Humanities & Social Sciences gave higher agreement on the usefulness of social media characteristics for creating, posting/re-posting, and commenting on media or information found online. Similarly, they also had higher agreement on

characteristics of social media to help make meaning of university learning, including building relationships with instructors, as well as creating, posting/re-posting, sharing, and commenting on media or information found online. Conversely, Natural Sciences & Engineering students placed higher importance on wikis in their learning, explained in the interviews as a part of their wayfinding.

Social media for cohort learning. Regarding discipline, the interviews and the survey responses show that students across disciplines view SMTs to be useful for group work (e.g., communicating for group assignments, connecting with peers, etc.). Notably, the results reveal that such SMTs are perceived to be especially valuable by students in cohort-based programs, where the same group of students generally progress through each year of their undergraduate program together. Cohort-based programs are common in professional disciplines, such as those within the health disciplines (e.g., Nursing, Medicine, Dental Hygiene, etc.). Interviews show that students within cohort-based programs (regardless of discipline) indicate that SMTs – specifically Facebook and Google Docs – help them to make sense of their learning, and are particularly useful as an educational tool. As the interview examples reveal, cohort-based students often point to the value of the Facebook groups they create for their own learning communities, and act as a student network for peer support and nexus for information sharing.

Pedagogical paradigm. Students in professions with a programmatic pedagogical paradigm, such as context-based learning (CBL), often articulated an important relationship between this pedagogical approach and their use of social media to help with their university learning; for instance, to facilitate small group activities via online communication and collaboration. While in some instances the use of social media (i.e., Google Docs) was initiated via scenarios with faculty, in other instances students themselves selected SMTs (e.g., Google

Apps, Facebook) to assist their learning. The importance of collaborative technologies within cohorts, and specifically SMTs that serve the purpose of building student-driven learning communities and aid in collaborative learning, is evident in both the qualitative and quantitative results. In the interviews, students in cohort-learning programs, which are primarily found in the health disciplines and often explicitly incorporate collaborative pedagogies (e.g., group work via context-based learning), revealed the importance of social technologies such as Google Apps and Facebook in their university learning. The survey results confirm that Health Sciences students place greater importance on social media for collaboration, including Google Apps and social networking (e.g., Facebook), and a higher agreement on the usefulness of collaborating to create documents online, as compared to students in other disciplines.

Expanding cohort-learning. Though there is a focus on cohorts in the health fields, a University of Alberta's (2006) cohort learning initiative working group discussion paper recommended that the university broaden the availability of cohorts so that "all students should have the opportunity of a common cohort academic experience early in their degree programs" (p. 2), with the goal of improving student engagement, retention, and satisfaction. However, interview examples reveal that many students outside of the health disciplines still do not have the opportunity to experience cohort learning. As students in cohort-learning programs indicated in their interviews, the positive outcomes that students in cohort-based programs articulated when creating student-driven learning communities via SMTs could be beneficially extended to students in other disciplines through increased student awareness of and education in social media and cohort-learning practices.

Categories of Social Media for Undergraduate Learning

An important contribution of this study is an updated and validated list of social media categories that undergraduates themselves choose to use in their university learning, and which go beyond faculty-led technology interactions, such as those within the LMS, that are a part of the formal curriculum. The development of these social media categories builds on the work of other scholars investigating digital native claims (e.g., White, 2007), and in particular the updated, but now out-dated, categories of social software established by Valtonen et al. (2010). As noted in the qualitative chapter, based on the literature and an environmental scan of contemporary social media, an updated version of these categories purposefully established for this study informed the interviews and survey. The interviews and survey responses both showed very low usage and understanding of do-it-yourself networks and social bookmarking, and so those items have been removed from the updated categories of social media as they are not commonly known or used by post-secondary learners in this study. The following outlines the updated and validated list of social media categories in university learning:

- Google Apps (*e.g., Google calendar, Google docs*)
- Social networking (*e.g., Facebook*)
- File sharing (*e.g., Dropbox, Google Drive, BitTorrent*)
- Video sharing (*e.g., YouTube, Vine*)
- Wikis (*e.g., Wikipedia, Wikimedia*)
- VOIP/instant messaging (*e.g., Skype, Google talk/chat*)
- Image sharing (*e.g., Flickr, Instagram, Pinterest*)
- Blogs (*e.g., Blogger, WordPress*)
- Microblogs (*e.g., Twitter*)

- Location-based apps (*e.g., Foursquare, Google Maps*)
- Social news sites (*e.g., Reddit*)

As social media evolve and change, it will be important for future studies not only to continue updating and validating specific categories of social media, but also to confirm whether and how broader groupings of the affordances of social media (i.e., the affordances related to the social media characteristics outlined below) may remain or change over time.

Characteristics of Social Media for Undergraduate Learning

Another key contribution of this study is the creation and validation of characteristics of social media for undergraduate learning. Responses for social media characteristics that are useful and help to make meaning of university learning (Q15 means ranging from 1.51 to 2.70 and Q16 means ranging from 1.78 to 2.68; see Tables A1.5 and A1.6) were higher overall as compared to those provided for the importance of particular SMTs (Q14 means ranging from 1.71 to 3.59; see Table A1.4 in Appendix A). In other words, there were generally higher mean rankings for these characteristics of social media than for the importance of specific SMTs themselves. When connected to notions of affordances, this reinforces that students generally gave higher agreement for these characteristics of social media as being useful for and helping to make meaning of their university learning. For the validated characteristics of social media for undergraduate learning, the results below are based on responses on characteristics frequently identified (listed from highest to lowest means):

Characteristics of social media for undergraduate learning:

- Collaborating to create documents online;
- Sharing information online;
- Tracking and managing your academic schedule;

- Building relationships with peers;
- Posting/re-posting media or information found online;
- Creating media to share online;
- Commenting on media or information found online;
- ~~Building relationships with instructors.*~~

**Note:* removed based on quantitative and qualitative findings.

Since social media change rapidly, identifying the underlying and persisting characteristics that enable meaningful interactions provides us with an understanding of what is afforded (see earlier examples discussed in the literature review). As social media continue to emerge and change over time, it is imperative to know the interactions that students view to be meaningful, and the reasons *why* they choose to use certain SMTs in their own learning. Knowing what is afforded via social media, and therefore valued by students, gives a fuller picture of the purpose and function of these interactions for university learning, from the students' perspective.

Student Social Media Choices: Theoretical Implications and Insights

The many ways in which social media can be used for making meaning in university learning are illustrated in the specific contexts of the educational interactions presented within the qualitative and quantitative findings. These findings illustrate student conceptions of meaning making, as well as a range of contextual factors, including demographic and disciplinary differences, that inform undergraduates' social media choices in their learning. These findings have important theoretical implications for understanding a number of important issues connected to the literature review and research questions framing this study, including the implications of these findings for building research-informed approaches that move beyond current tropes within digital native discourse by instead examining meaningful educational

interactions (Anderson, 2008; Woo & Reeves, 2007) and focusing on affordances as an alternative to technological determinism (Buckingham, 2011; Selwyn, 2012), described below.

Social Media as a Double-Edged Sword:

Amplification/Reduction in the Human-Technology Experience

Within the qualitative interviews and the open-ended survey results, there is an overarching theme of social media as a double-edged sword that both informs and distracts, having the potential to both help and hinder learning. It is fascinating to see reflexivity in students' complex descriptions of choosing to use or not to use SMTs in their learning. Indeed, while not overtly identified as a philosophy, these descriptions do often reflect a philosophical approach to technology. As Kanuka (2008) notes, whether tacitly held or explicitly pronounced, both educational (e.g., liberal, progressive, behavioural, etc.) and technological (e.g., uses determinism, technological determinism, social determinism, etc.) philosophies can and do inform choices to use or not to use technologies in educational practice. While not explicitly described by students as a philosophy, this metaphor of social media as a double-edged sword in learning nonetheless presents important philosophical implications, particularly those related to technological determinism within the digital native debate, as outlined in the literature review. This metaphor of a double-edged sword illustrates not only what is gained but also what is lost when using these SMTs in educational interactions, reflecting an underlying philosophy of technology that recognizes the importance of context and articulating what is afforded, rather than employing reductionism and technological determinism.

In the qualitative and quantitative responses, many students indicated that whether using social media can help or hinder learning depends on the context, purpose, or intention of the interaction – what can be afforded by the technology in question. Indeed, such affordances

represent what Selwyn (2012) described as “what people perceive and signify during their actual interaction” (p. 89) with technologies. This description of social media as double-edged sword having the potential to help and hinder, to inform and distract, illustrates what Ihde (1990) termed the “amplification/reduction structure of the human-technology experience” (p. 78). In using technologies, particular aspects of our experience are amplified, while others are reduced. This amplification/reduction structure in the human-technology experience necessarily asserts the non-neutrality of such interactions and exchanges. Ruse (2005) summarized the key aspects of Ihde’s philosophy of technology, as follows:

As Ihde has pointed out, technology is context-dependent in that it is embedded in the culture's world-view as a set of practices with more or less definite meanings for that culture. Due to the "cultural embeddedness" of technology, it would be imprecise to claim that technology is ever transferred in a strictly ideological form. Instead, an interface between the products of one culture and another form a conduit between the world-views which characterize one cultural form of human activity as opposed to another. The exchanged artifacts may or may not be embedded in the receiving culture the same way as in the sending culture. . . . This leads Ihde to claim that although technology is non-neutral (it transforms "humans and humans-in-culture"), it does not have one specific trajectory. In other words, it is structurally ambiguous. (p. 10)

Understanding technologies in this way, the metaphor of social media as a double-edged sword represents the amplification and reduction of particular aspects of students’ human-technology experience. Overall, student descriptions illustrate the context-dependent nature of technological interactions and exchanges that are embedded within their academic and social cultures, world-views, and practices. These descriptions illustrate what Jonassen and Reeves (1996) described as

meaningful learning with technologies as cognitive tools “that amplify, extend, and even reorganize human mental powers to help learners construct their own realities and complete challenging tasks” (p. 697), ideally in constructivist learning environments. The definite meanings and contexts of these exchanges and interactions are clearly articulated in student descriptions of why and how they choose to use or not to use social media for learning, as well as the specific ways in which they make meaning via social media, as illustrated by the core categories of meaning making and key characteristics of social media highlighting the affordances for learning that have emerged from this study.

The importance of world-views and practices when considering social media in learning comes to light in student descriptions of the particular educational interactions and disciplinary practices related to (and, mediated by) their human-technology experience. While recognizing that there is neither one trajectory nor one defined structure for human-technology experiences, the categories and characteristics of meaning making and social media defined by this study reveal a number of meanings and affordances that comprise the many diverse trajectories of university learning, based on student practices that are embedded within cultures and contexts, such as discipline and other demographic factors.

Meaningful Educational Interactions

This study’s finding also provide insights into the educational interactions that students themselves view to be meaningful in their university learning. Recognizing that social media both helps and hinders their learning, students often indicate making intentional choices regarding whether and how educational interactions with peers or content occur via social media or through other means (i.e., choosing options such as face-to-face interactions or print media). In particular, the results of this research on social media in university learning demonstrate two

of the three educational interactions in Anderson's equivalency theorem. In his work on the theory and practice of online learning, Anderson (2008) noted that "[t]he greatest affordance of the Web for education use is the profound and multifaceted increase in communication and interaction capability.... Interaction has long been a defining and critical component of the educational process and context" (p. 54). Similar to Ruse's and Ihde's use of the term *exchanges*, Anderson (2008) defined interactions as "different types of exchanges between different actors and objects associated with teaching and learning" (pp. 54-55), and further indicated these interactions are reciprocal events requiring two or more objects and actions influencing each other. Noting that interactions are a key component of constructivist learning theories, Anderson presented six types of educational interactions: student-student, student-content, student-teacher, teacher-content, teacher-teacher, and content-content interactions. Notably, Anderson's equivalency theorem asserted that "deep and meaningful learning can be developed as long as one of the three forms of interaction (student-teacher; student-student; student-content) is at very high levels" (p. 67). According to Anderson, having strong educational interaction in one of these forms allows elimination of the other two without degradation of the educational experience.

Addressing Anderson's equivalency theorem. The results of this study show a high degree of importance for and usage of social media in undergraduates' learning for student-student and student-content interactions, but much less so (or, in some cases, not at all) for faculty-student interactions. Though Moore's (1989) earlier articulation of three types of interaction helped to shape this discussion, I engage here with Anderson's (2008) more recent and updated articulation of these types of interactions. It is clear from the qualitative and quantitative findings that students use social media for what Anderson (2008) has defined as

collaborative learning (student-student) and independent study (student-content). Does this mean that deep and meaningful learning can occur via social media? According to Anderson's equivalency theorem, wherein strong student-student or student-content interaction can provide meaningful learning, the answer is yes. Indeed, in their recent publication *Teaching Crowds: Learning and Social Media* (2014), Dron and Anderson state this clearly: "We believe that these [social media] tools are too important and powerful to be excluded from the formal curriculum, that they can be used to support and encourage learning in all subject domains" (p. 26). It is important to note that the findings of this study *do not* demonstrate that adding social media more formally in higher education curriculum would be so broadly beneficial, especially with student resistance to particular faculty-student interactions on social media. While meaningful educational interactions can and do occur via social media, the decision whether or not to use social media in formal curriculum depends again on careful consideration of what is afforded, of what is lost or gained, particularly noting the concerns that students presented and their desire to separate many parts of their social and academic lives, and to maintain their own online social spaces for students helping students without authority figures, such as professors, present.

Though Dron and Anderson (2014) discussed at length the many benefits of social media, the authors only briefly discussed the challenges of social media (e.g., privacy), and a limitation of their work is that several key hindrances noted in this study (such as distraction) are either absent or not discussed in detail. If engaging in debate and interacting with conflicting opinions and perspectives are critical to learning, as social constructivist learning theorists and undergraduate students alike have affirmed, then student concerns about the absence of a dislike button and the limitations of SMTs for addressing conflict need to be considered further. Friesen

and Lowe (2012) echoed such concerns in their strong critique of the “questionable promise of social media for education” (p. 183) as related to connectivism and commercial imperatives.

Accounting for the overarching theme of the double-edged sword, and understanding that students overwhelmingly recognized the ways in which social media both helps and hinders (or, amplifies/reduces) their learning, broad recommendations such as Dron and Anderson’s (2014) to include social media in the formal curriculum become problematic. Here again, the response from second year Arts student Hillary summarizes this point well: “depends on what you’re learning, right?” Coupled with recurring undergraduate descriptions of the importance of preserving other (face-to-face, print, etc.) ways of learning, students clearly articulated that social media is simply *one* of many ways in which they make meaning of their university learning.

While the findings of this study show that meaningful interactions in university learning can and do occur via social media, and should not unnecessarily be excluded from learning, the characteristics of and relationships between *specific* ways of making meaning and *specific* SMTs outlined in this study illustrate critical affordances and contexts. According to students meaningful learning is already occurring via social media for student-student and student-content interactions, rather than via faculty-student interactions, and so it becomes important to question the roles educators and administrators may have regarding social media in their institutions. The recommendations provided in the conclusion of this chapter suggest ways in which educators and administrators can understand their roles in fostering the helpful aspects of social media while limiting the hindrances. This evidence aims to support careful, research-informed decision-making in practice (whether as faculty working with undergraduates, or as a student) regarding whether to use – or equally to not use – SMTs in university learning.

Separating social and academic spheres. These findings demonstrate the different ways in which student use – and, at times, separate – social media for academic or social purposes. This separation is further highlighted by undergraduates’ use of social media for student-student and student-content, rather than faculty-student, educational interactions. While newly published findings from researchers such as Gallardo-Echenique, Marqués-Molíás, and Bullen (2015) have discussed student perspectives and uses of social media for both academic and social purposes, they do not account for student perspectives regarding the need to separate these social academic spheres. Bullen and Morgan’s (2015) research on digital learners more closely addressed this issue through detailed user profiles (instrumental user, separator, and integrators), using activity theory to designate a “separator” profile for students who (consciously or unconsciously) separate their academic and social practices, even when indicating a desire for more technology integration. Similarly, the interview findings in this study reveal a range of ways that many students typically separate at least some parts of their academic and social lives, even if they are large users of social media in parts of their learning.

Given the methodological differences between this study and the work of Bullen and Morgan (2015), one cannot conclusively confirm whether this separation truly deserves its own distinct classification or profile as Bullen and Morgan outlined, or whether such acts of separation are a wider part of recognizing social media as a double-edged sword as this study shows. However, it is worth noting that the interview results from this study reveal that student perspectives on social media roles (or profiles) are not fixed, but instead involve an ongoing developmental process. For example, Engineering student George noted that, “by fourth year, I would expect to be the one contributing to Wikipedia articles rather than be the one reading it.” Examples such as this illustrate that while some students may exhibit “instrumental user”

qualities, especially early in their university learning, this role is not static nor is it necessarily due to a lack of technical skills, but may be done intentionally because of student views on the perception that expert knowledge is required to be an effective contributor. Furthermore, the findings in this study regarding separation more closely echo student perspectives of social media noted in N. Jones et al.'s (2010) appropriately entitled article "Get Out of MySpace!" which highlighted both the benefits and also the challenges of social media, including some students' refusal to "use social software for learning due to their separation of 'life' and 'studying' or 'home' and 'lectures'" (p. 779).

Understanding the Meaning of Meaningful: Social Constructivist Underpinnings

Meaning making is frequently mentioned in reference to education, and the "meaning of meaningful interaction" is strongly related to learning theories (Woo & Reeves, 2007, p. 16). Yet, often while invoking the term "meaningful learning," researchers and practitioners fail to provide a clear definition for what constitutes "meaningful" interactions within learning. For example, while frequently using the term "meaningful" in their creation of a model for e-learning in Canada (called the Meaningful E-Learning Project, or MEL), Salyers, Carter, Carter, Myers, and Barrett (2014) discussed in detail the term e-learning, but failed to provide any definition or context for what constitutes meaningful learning. Here again, from a deterministic view, the focus is on the effectiveness of technology and on defining e-learning, ignoring the key issue of what it means to be *meaningful*. Furthering our understanding of meaningful learning, particularly from the perspective of undergraduate students, is a main contribution of this study.

As reflected in Anderson's (2008) equivalency theorem, many thinkers connect deep learning to meaningful learning. However, while there is much rigorous research on deep versus surface approaches to learning (e.g., Trigwell, Prosser, & Waterhouse, 1999), as Woo and

Reeves (2007) aptly showed, the meaning of meaningful learning is necessarily relative in that it depends upon how we understand learning itself, as reflected in learning theories. This reinforces the importance of framing technological affordances for meaningful educational interactions, such as those presented via social media, with explicit connections to how learning is understood and to research-informed theoretical groundings.

This study is framed within a social constructivist approach for several reasons, as noted in the early chapters, and alignment between the affordances of social media and the premises of social constructivist learning theories (Dron & Anderson, 2014) are well established. Therefore, these findings contribute to our understandings of social constructivism through undergraduates' definitions of meaning making, as well as the specific ways in which they make meaning in their university learning, including the specific ways in which such social-technological interactions inform and reflect meaning making processes in undergraduate learning. These contributions to knowledge are grounded upon and further illustrate the importance of social constructivist theories.

Technology and Generation as Zeitgeist: Moving Beyond Digital Native Claims

The findings in this study contribute to building enhanced, research-informed understandings of Net generation students that move beyond current digital native discourse. Rather than reflecting common digital native claims that scholars such as Thomas (2011) have summarized (see chapter 2), and confirming other recent research in this area (e.g., Gallardo-Echenique et al., 2015; Helsper & Eynon, 2010; Selwyn, 2009; C. Jones & Healing, 2010), this study presents a picture of students rather as taking a diverse range of approaches to technologies that are context-dependent, not the homogenous generation summarized in previous digital native discourse. These findings also confirm the work of Margaryan et al. (2011) who refuted

“popular claims that young people adopt radically different learning styles” (p. 429). Though several students mentioned their individual learning styles as one reason to use SMTs, they did not articulate radically new or different ways of learning, but often described commonly recognized learning styles (e.g., visual, auditory, kinesthetic).

This study illustrates why students use the metaphor of a double-edged sword to describe a zeitgeist of generation and technology. While some students in this study identified exposure to and growing up with technology as an important factor, such sentiments often reflected an overall zeitgeist rather than a demand for technology in all learning situations. For example, this appeared in several articulations the negative aspects of technological dependence and the value of maintaining some traditional (e.g., face-to-face, print, etc.) ways of learning and communicating. This zeitgeist relation to social media as a double-edged sword reflects students’ perceptions of social media as an important yet complicated part of their everyday lives.

Overall Implications

Overall, the findings in this study emphasize that while general ideas of meaning making and social media are often similar for undergraduate students, delving further into the specific ways of making meaning and the specific uses of social media in context illustrates a number of important relationships and differences between undergraduates when considered in context. These specificities highlight important disciplinary differences between Humanities & Social Sciences, Natural Sciences & Engineering, and Health Sciences groups. Furthermore, these findings illustrate the distinct ways in which undergraduates in cohorts, which in some areas are associated with particular pedagogies such as context-based learning, view social media to be an essential part of their cohort-learning experience. Other demographic differences, such as sex and year of study, come to the fore and reinforce the importance of considering meaning making

and social media both in context and as a process that occurs and develops over time. These specificities and distinctions help in understanding the key categories and characteristics of social media for university learning that emerge from this study, illustrating what certain SMTs afford. Finally, student descriptions of social media as a double-edged sword that both helps and hinders creates a rich picture of the many facets of these affordances – what is lost and gained, what is amplified and reduced – in learning. As we turn to the conclusion, the implications outlined here will be considered in conjunction with key recommendations and areas for future research.

Conclusion

Following the results and the implications of these findings as outlined in the discussion, several recommendations and areas for future research emerge. The purpose of this concluding section is to outline in detail key recommendations related to the study's findings, including implications for pedagogy in practice, as well as priorities for future research studies.

Build Awareness of Student Perspectives and Uses of Social Media in Learning

Based on this study's findings, the primary recommendation is to build educators' and administrators' research-informed understandings of undergraduate perspectives and uses of social media in their university learning, in order to inform evidence based decision-making in higher education policy and practice. This includes further developing evidence based approaches to decisions for using (or, not using) SMTs in university learning, as well as recognizing that there is a need to move beyond ideas of the digital native by instead focusing on why and how students view social media not as simply a potential benefit but also a potential hindrance to their learning. As such, decisions about social media in undergraduate learning need to be intentionally and thoughtfully considered in university settings.

Given that the findings of this study demonstrate why and how students choose to use SMTs for student-student and student-content educational interactions, rather than faculty-student educational interactions, questions remain about the role of educators and administrators in social media for university learning. Although student participants described important interactions with faculty and TAs in their learning, they often described these interactions as occurring via face-to-face or email communications, not via SMTs. Indeed, when students described situations where faculty did integrate social media in their formal curriculum, those students often created work-arounds to avoid these interactions. Deborah's description of how one student would copy and paste the content from Twitter into their cohort's Facebook group because "not most of us have Twitter or bother following it" is an excellent example of this. While students described the value of all three kinds of educational interactions (e.g., student-student, student-content, and faculty-student), they indicated using social media only for the first two, but oftentimes they actively separated their educational interactions with faculty from social media, preferring their faculty-student learning interactions to instead happen face-to-face or via email. Related to these findings, the results of this study agree with N. Jones et al.'s (2010) assertion that "online learning and social personas may overlap but that learning needs to be *designed so that it addresses the individual preferences to combine or separate the two domains*" (emphasis in original, p. 781). Aligning with these guidelines, a key recommendation of this study is that administrators and educators must plan for and enable an appropriate separation between social and academic uses of social media in university that does not require or force undergraduate students (or faculty) to combine these domains.

Explore digital literacies with SMTs. Indeed, this study demonstrates that students are already making meaningful use of social media through intentional choices to use (or, to not use)

SMTs in their learning, specifically for student-student and student-content interactions. However, rather than making social media itself a part of the formal curriculum, as Dron and Anderson (2014) recommend, this study shows the need for building digital literacies with the SMTs students are already using in their day-to-day lives. While some social media (e.g., YouTube, Google Apps, etc.) naturally fit and are already used within the formal curriculum beneficially, there are concerns from students in this study and from researchers about integrating other social platforms such as Facebook (e.g., Friesen & Lowe, 2012) into the formal curriculum that should be heeded. As such, another recommendation emerging from this study is to recognize that some social media can be well-integrated and blended with the formal curriculum, especially for student-content interactions, but that institutions should endeavor to teach students the digital literacies needed for navigating the parts of their learning that support but are separate from the formal curriculum rather than simply integrating social networking technologies (such as Facebook) into the curriculum for student-student or faculty-student interactions..

As such, a secondary recommendation is to explore opportunities for comprehensive undergraduate student education developing digital literacies for social media in university learning, particularly in first year where many students noted a difficult transition with SMTs in their learning. This secondary recommendation is outlined below as any area in need of further research connected to practice. Throughout this study, reference to a range of literacies, including information, media, and digital literacies, have come to the fore, especially during discussions with students, and the overlap between these concepts is not surprising since these terms are at times used interchangeably. Indeed, as Koltay has argued, “[m]edia literacy, information literacy and digital literacy are the three most prevailing concepts that focus on a

critical approach towards media messages” (2011, p. 211). The term *digital literacies* has been intentionally selected as an overarching definition for “the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet,” (Cornell University, 2009). Here, digital literacies includes within it information and media literacies, described in further detail below.

Areas for Future Research

Just as many institutions recognize the importance of teaching students essential meta-cognitive and information literacy knowledge and skills, the findings in this study demonstrate the prevalence and importance of issues surrounding appropriate use ICT and SMTs both within and outside of the formal curriculum. Digital literacy should be recognized, treated, and included as a part of a comprehensive undergraduate education. Based on evidence in this study, developing students’ knowledge and skills with regard to wider digital literacies fosters their abilities for integrating beneficial aspects of social media (helping categories) and mitigating the drawbacks (hindering categories). Students in this study themselves expressed a need to further understand specifically why and how certain SMTs should (or, can be) used for learning in meaningful ways, and future research connected to practice will help to build understandings of meaningful use of SMTs and effective ways to teach undergraduates in these areas. This is echoed by recent ECAR findings showing that undergraduates today do not feel better prepared to use technologies than in previous years, and they indicated they could be more effective if they were better skilled at using technologies, including SMTs, for learning (Dahlstrom et al., 2015, pp. 24-27).

Comprehensive Undergraduate Education for Digital Literacies

Curricular support, typically from the university library, is already successfully provided at almost all HEIs to foster information literacy skills as an essential part of undergraduate education across disciplines, although such curriculum may occur in one-time sessions rather than comprehensive initiatives. Furthermore, many Canadian universities, such as the University of Victoria and the University of Waterloo, have introduced *University 101* as a credit or non-credit offering that teaches students the meta-cognitive abilities necessary for success in university and lifelong learning through a range of topics including wellness, time management, test taking, academic writing and reading, research skills, note-taking, and critical thinking. In Alberta, this curriculum has been successfully introduced at Mount Royal University as a 13-week credit first year course on *Effective Learning in the Undergraduate Context*. A digital literacy initiative at institutions such as the University of Alberta could follow other successful higher education models in this area. For example, following research confronting myths of digital natives (Hargittai, 2010), professor Eszter Hargittai implemented a 13-week course at Northwestern University that builds undergraduate students' digital literacies, subsequently featured in *The Chronicle of Higher Education* (O'Neil, 2014).

Likewise, Littlejohn, Beetham, and McGill (2012) emphasize that higher education “institutions need to place greater value on ‘literacies of the digital’, and better prepare their students and their own organizational processes to thrive in an age of digital knowledge practices” (p. 547). In their comprehensive analysis of higher education policy and practice, the authors identified the following important components digital literacies: 1) viewing digital literacies as knowledge practices; 2) acknowledging the limits to native knowledge; 3) recognizing the limits of instrumental competence frameworks by “building an identity as a

digitally capable graduate, scholar or professional” (p. 552); and 4) supporting learners to succeed (pp. 549-553). Such examples demonstrate that there are several evidence-informed approaches to digital literacy programs in higher education policy and practice, and that these can inform the creation and implementation of such initiatives elsewhere. Further research could explore whether teaching students digital literacies related to social media categories, characteristics, and affordances (e.g., organizing and connecting, building understanding, and information seeking and sharing) is effective at fostering meaningful learning. Additionally, further studies on digital literacies related to SMTs broadly should be conducted in Canadian contexts to examine the potential benefits and effectiveness of teaching digital literacies related to SMTs in HEI practice.

Expanding Upon the Findings in Future Research

As discussed in the introduction to this dissertation, as with any research undertaken, this study has limitations. Future research can address these limitations via additional approaches to the phenomena investigated. For example, this study occurs in the context of a large research institution, the University of Alberta, located in Western Canada, and therefore should not be viewed as directly transferrable or generalizable in other locations or those other post-secondary institutions with different educational mandates, such as technical institutes or teaching-focused universities and colleges. As such, it will be valuable to explore these findings further in other post-secondary contexts and future researchers may further investigate aspects of making meaning in learning in other institutions. Investigating how undergraduates at different types of institutions most often make meaning of their learning – socially and individually – and the circumstances and reasons why this is so regarding social media choices, would be a particularly valuable contribution to contemporary understandings of social constructivism in other contexts.

There are also limitations within this study's sample types (a purposeful sample for the interviews, and a convenience for the survey) regarding wider transferability and generalizability of the findings (Cohen et al., 2011). Future studies could examine these phenomena via other sample types; for instance, using probability (e.g., random) samples for further surveys. Such further research would be valuable, particularly in further examining demographic data, since participation of females ($n = 442$, 68.6%) in the survey is higher than the overall percentage of females undergraduates at the University of Alberta and in Canada overall. Additionally, since this study examined students' perceptions and self-reported uses of SMTs as they relate to meaning making and university learning, further research investigating directly students' interactions, performance, or tasks related to specific educational activities or instructional design principles (e.g., via observation) would be useful.

Taking a reflexive approach to this research, there are some aspects that I would consider updating in the future. For the survey, it may be useful to consider adding a question or description at the beginning to further clarify what is meant by one's own learning in university (versus learning in formal curriculum) up front. For the Faculty question (Q4), I would also add in other U of A campuses (this was adjusted manually when students responded with Campus St. Jean and Augustana in the "other" field), and I would change the birth year question (Q7) to a question about age (e.g., selecting age from drop-down) to make data analysis more streamlined. I would also ask a question determining Open Studies students up front, which I learned about after seeing students enter this information in an open-ended string field attached to the year of study question (Q6). For the interview guide, I would consider changing the order of a couple of the early items, so that the question asking students how they define meaning making in university learning occurs later in the interview after some contextual discussion has already

occurred. This change may help students and the interviewer by allowing more time mull over a potentially difficult question about tacit understandings of meaning making *after* they have been in the interview for a few minutes and have adjusted to the flow of the discussion and questions.

Meaning Making and Social Constructivism

There are several other areas for future research to build upon and further investigate these findings. Knowing how specific ways of making meaning (e.g., applied to a career, involving research, etc.) may overlap or change in other institutional contexts will also be an important area for future research. Students' suggestions, provided within the open-ended survey responses, point to potential ways of meaning making for future study, and include the following: (re)writing something for myself; personal maturity and knowing myself; drawing, mapping, and connecting ideas; systematic inquiry and presenting my findings; setting grades aside. Furthermore, since it is not entirely clear why students in third year indicated higher agreement on making meaning of university learning by creating media to share online, as compared to those in fourth year, this is another area for future research. Finally, demographic findings related to social media and meaning making in learning, such as those related to sex and year of study, should also be further explored in future research.

As noted in the discussion, wayfinding (particularly in technology-mediated learning) and related constructivist notions of symbolic interactionism is an area in need of further study. While recent scholars have associated wayfinding specifically with connectivism (e.g., Siemens, 2011; Wang, Chen, & Anderson, 2014), other thinkers have criticized connectivism (e.g., Clarà & Barberà, 2014; Kop & Hill, 2008). It is difficult to deny the crossover between connectivist and constructivist ideas and claims, particularly as they relate to networked technologies. For example, just as this study makes recommends on educational initiatives providing learners with

broader knowledge and skills regarding information and digital literacies from a constructivist perspective, similar digital literacy recommendations have been made in relation to connectivist claims (e.g., Littlejohn et al., 2012). This study provides evidence that student descriptions of social media in their learning, including describing a process of wayfinding for information and help seeking interactions, are well aligned with and explained by social constructivist theories of learning. Investigating more specifically why and how digital literacies and educational interactions involving social media, especially for the student-student, student-content, and faculty-student interactions that comprise Anderson's (2008) equivalency theorem, may specifically fit with either constructivist or connectivist theories (or, possibly some evolution of the two combined), is an area in need of further research.

Generation, Identity, and New Media

Other important areas for future research include issues of generation, identity, and new media. In analyzing the digital native debate in higher education, I have argued that examining digital native notions with a critical eye does not necessarily mean rejecting all Net gen claims outright, but instead involves careful examination of the complexities associated with such claims (E. Smith, 2012, p. 9). Referencing and concurring with this research, Pattaro's (2015) recent work built upon these ideas in a valuable way, identifying a number of contemporary issues and research pathways. Pattaro provided an important discussion of the intersection of youth identity and digital media, and related to notions of a digital-generational zeitgeist discussed here. Consider the assertion of the importance of recognizing the role that generation has as historical-social dimensions of space-time, and as related to generational identities:

In the case of digital natives, [media can shape generational identities and] one of these elements seems identifiable with the advent of the Internet and in the expansion of digital

culture. They are the first generation to grow up in a digital environment.... They actively contribute, share, search for and consume content on social media platforms... (p. 300)

Within this study, student descriptions of a generational zeitgeist related to growing up with Internet technologies, including social media as a double-edged sword, reflect these characteristics of a socio-anthropological construct as Pattaro described. Echoing Pattaro's analysis, students in this study described social media as a part of their day-to-day lives, though the complexities of the double-edged sword and other implications move well beyond popularized and over-simplified notions of the Net generation as digital natives. The many facets of generation, technology, and identity will continue to be important areas of study, as researchers and practitioners are now beginning to move beyond digital native discourse in a meaningful way. As such, this study presents findings challenging not only the claims of futurists such as Prensky (2001a, 2001b) who portrayed the digital native and immigrant issues in unevicenced, binary terms, but also from researchers such as Bullen et al. (2011) who stated that "generation is not the issue" (p. 1) whatsoever. Instead, these findings show the nuanced descriptions of generational-technology perspectives that relate to issues of identity, such as those described by students in regard to their overall experience growing up with technologies as well as their specific disciplinary experiences with social media, and acknowledges the intersections of generation, identity, and technology as complex issues that need further research, including future studies analyzing longitudinal generational data.

Affordances of Social Media for Learning

It is also important for future studies not only to continue updating and validating specific categories of social media for learning, but also to further investigate broader characteristics and categories of social media (i.e., as related to affordances) revealed, as they may remain constant

or change over time. Again, suggestions provided within student responses illustrated new SMTs that could be further explored: Q & A communities (e.g. Wolfram Alpha, Stack Exchange, Ask.com), social study applications (e.g., Study Blue), do-it-yourself communities (e.g., Instructables), online presentation software (e.g., Prezi), mobile messaging tools (e.g., Snapchat, What's App), and organization applications (e.g., Trello).

Student- and faculty-managed technologies. While this study focuses on social media and intentionally excludes other technologies, such as learning management systems (e.g., Moodle, BlackBoard) and web conferencing (e.g., Adobe Connect), future studies may explore whether there are overlaps with or distinctions between faculty-led and student-selected technologies for learning. In particular, students who participated in this study would ask questions to clarify whether aspects of eClass (i.e., Moodle), such as discussion forums, can or should be included under the umbrella of social media. Since the focus of this study is on the learner's own perceptions of social media that they themselves choose in their university learning, and there is a range of well-established research on educational technologies such as learning management systems and web conferencing systems, this study intentionally excluded studying these aspects in detail. However, as SMTs may increasingly become integrated into face-to-face and online learning, it will be useful to conduct future research on the potential pitfalls and benefits of blending institutionally supported and faculty-managed technologies (e.g., LMS, web conferencing tools, Google Apps) with student-selected technologies and learning communities. Additionally, further study with faculty and administrators is needed to understand what role (if any) may exist for social media in faculty-student and potentially administrator-student and administrator-faculty interactions.

The Importance of Undergraduate Student Perspectives

Newly published research emphasizes a continued need for studies, such as this one, which build further understanding of students' perspectives and uses of social media in their learning. For example, Hamid et al. (2015) recently noted the following:

[D]etailed analyses of student perspectives covering a range of learning settings are less common.... [L]ittle is known about how students feel about the interactivity benefits of social technologies.... Understanding how students feel about using social technology to interact with each other or with their lecturers can help inform future implementations of OSN [online social networking] activities in higher education... (p. 2)

By providing detailed analysis of student perspectives regarding social media in different learning settings (i.e., different disciplines), this study addresses current gaps in the literature. Indeed, much research on these issues focuses on SMTs used formally as a part of a course (i.e., incorporated into formal curriculum by instructors). The focus of this dissertation research is on student perspectives of SMTs that they themselves choose to use (or not to use) for their own learning, an area also missing in the current literature. In examining student perspectives and uses of social media in this way, this study addresses several gaps. Rather than primarily outlining the benefits of social technologies, this study presents a more nuanced and complex picture of the benefits and limitations of social media to potentially help and hinder university learning, and provides key recommendations that aim to foster the helpful and mitigate the hindrances of SMTs in learning.

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Appendix A:
Supporting Descriptive Data

Table A1.1

Descriptive Statistics of Age

		Age
<i>n</i>	Valid	647
	Missing	32
Mean		22.34
Median		21.00
Mode		20
Std. Deviation		4.77
Variance		22.79
Minimum		18
Maximum		55

Table A1.2

Discipline

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Health Sciences	74	10.9	11.4	11.4
	Natural Sciences & Engineering	319	47.0	49.2	60.6
	Humanities & Social Sciences	237	34.9	36.5	97.1
	Other & Open Studies	19	2.8	2.9	100.0
	Total	649	95.6	100.0	
Missing	System	30	4.4		
Total		679	100.0		

Table A1.3

Q4 - What Faculty are you enrolled in?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agricultural, Life and Environmental Sciences	42	6.2	6.5	6.5
	Alberta School of Business	30	4.4	4.6	11.1
	Arts	143	21.1	22.0	33.1
	Education	61	9.0	9.4	42.5
	Engineering	94	13.8	14.5	57.0
	Law	1	.1	.2	57.2
	Medicine & Dentistry	20	2.9	3.1	60.2
	Native Studies	2	.3	.3	60.6
	Nursing	27	4.0	4.2	64.7
	Pharmacy and Pharmaceutical Sciences	12	1.8	1.8	66.6
	Physical Education and Recreation	14	2.1	2.2	68.7
	Rehabilitation Medicine	1	.1	.2	68.9
	Science	183	27.0	28.2	97.1
	Other: Augustana Campus	7	1.0	1.1	98.2
	Other: Campus St. Jean	6	.9	.9	99.1
	Other: Open Studies	6	.9	.9	100.0
	Total	649	95.6	100.0	
Missing	System	30	4.4		
Total		679	100.0		

Table A1.4

Q14 Descriptive Statistics

		Blogs	Wikis	Google Apps	Image sharing	Social bookmarking	Social networking	Social news sites
<i>n</i>	Valid	427	427	434	429	424	432	427
	Missing	252	252	245	250	255	247	252
	Mean	3.19	2.16	1.85	3.29	3.59	2.49	3.21
	Median	3.00	2.00	2.00	3.00	3.00	2.00	3.00
	Mode	3.00	2.00	1.00	3.00	3.00	2.00	3.00
	Std. Deviation	1.05	1.07	0.95	1.08	0.94	1.09	1.05
	Variance	1.10	1.14	0.90	1.18	0.88	1.19	1.11

Table A1.4 Continued

Q14 Descriptive Statistics

		VOIP and Instant messaging	Do-it-yourself networks	File sharing	Video sharing	Location-based applications	Microblogs
<i>n</i>	Valid	427	417	429	431	421	420
	Missing	252	262	250	248	258	259
	Mean	2.63	3.40	1.71	2.03	3.21	3.35
	Median	3.00	3.00	2.00	2.00	3.00	3.00
	Mode	2.00	3.00	1.00	2.00	3.00	3.00
	Std. Deviation	1.07	0.94	0.85	0.99	1.05	1.08
	Variance	1.15	0.874	0.73	0.98	1.11	1.17

Table A1.5

Q15 Descriptive Statistics

		Building relationships with peers	Building relationships with instructors	Creating media to share online	Sharing information online	Posting/ Re-posting media or information found online	Commenting on media or information found online	Collaborating to create documents online	Tracking and managing your academic schedule
<i>n</i>	Valid	426	425	424	421	420	420	422	423
	Missing	253	254	255	258	259	259	257	256
	Mean	1.78	2.70	2.36	1.69	2.13	2.48	1.51	1.63
	Median	2.00	3.00	2.00	2.00	2.00	2.00	1.00	1.00
	Mode	2.00	2.00	2.00	2.00	2.00	2.00	1.00	1.00
	Std. Deviation	0.81	1.10	0.99	0.76	0.95	1.00	0.70	0.80
	Variance	0.65	1.21	0.98	0.58	0.91	0.99	0.49	0.65

Table A1.6

Q16 Descriptive Statistics

		Building relationships with peers	Building relationships with instructors	Creating media to share online	Sharing information online	Posting/ Re-posting media or information found online	Commenting on media or information found online	Collaborating to create documents online	Tracking and managing your academic schedule
<i>n</i>	Valid	423	421	420	421	421	420	422	421
	Missing	256	258	259	258	258	259	257	258
	Mean	2.06	2.68	2.47	1.94	2.37	2.59	1.78	2.00
	Median	2.00	3.00	2.00	2.00	2.00	3.00	2.00	2.00
	Mode	2.00	2.00	2.00	2.00	2.00	2.00 ^a	1.00	2.00
	Std. Deviation	0.96	1.11	1.04	0.83	0.99	1.02	0.87	0.95
	Variance	0.92	1.24	1.08	0.69	0.98	1.04	0.76	0.89

a. Multiple modes exist. The smallest value is shown

Table A1.7

Ways of Making Meaning Related to Year of Study

Variables Examined: Q10 Ways of Making Meaning	Discipline <i>n</i> (percent)					
	Health Sciences		Natural Sciences & Engineering		Humanities & Social Sciences	
	Yes	No	Yes	No	Yes	No
Gaining your own deep understanding (e.g., of a concept).	60 (81.1%)	14 (22.6%)	247 (77.4%)	72 (22.6%)	180 (75.9%)	57 (24.1%)
Saying something in your own words.	45 (60.8%)	29 (39.2%)	163 (51.1%)	156 (48.9%)	139 (58.6%)	98 (41.4%)
Interacting with different perspectives.	40 (54.1%)	34 (45.9%)	132 (41.4%)	187 (58.6%)	141 (59.5%)	96 (40.5%)
Discussing with other people.	43 (58.1%)	31 (41.9%)	170 (53.3%)	149 (46.7%)	149 (62.9%)	88 (37.1%)
Applying your experience to real life (e.g., your career).	52 (70.3%)	22 (29.7%)	196 (61.4%)	123 (38.6%)	172 (72.6%)	65 (27.4%)
Putting your learning into context.	49 (66.2%)	25 (33.8%)	171 (53.6%)	148 (46.4%)	157 (66.2%)	80 (33.8%)
Researching information.	42 (56.8%)	32 (43.2%)	154 (48.3%)	165 (51.7%)	115 (48.5%)	122 (51.5%)
Seeking help from others.	35 (47.3%)	39 (52.7%)	127 (39.8%)	192 (60.2%)	90 (38.0%)	147 (62.0%)
Working through the process of figuring something out (e.g., solving a problem).	50 (67.6%)	24 (32.4%)	232 (72.7%)	87 (27.3%)	135 (57.0%)	102 (43.0%)

Table A1.8

Specific Social Media Use Related to Discipline

Variables Examined: Q13 Social Media Use	Discipline <i>n</i> (percent)					
	Health Sciences		Natural Sciences & Engineering		Humanities & Social Sciences	
	Yes	No	Yes	No	Yes	No
Blogs (e.g., Blogger, WordPress)	7 (9.5%)	67 (90.5%)	50 (15.7%)	269 (84.3%)	60 (25.3%)	177 (74.7%)
Wikis (e.g., Wikimedia)	31 (41.9%)	43 (58.1%)	151 (47.3%)	168 (52.7%)	86 (36.3%)	151 (63.7%)
Google Apps (e.g., Google Calendar, Google Docs)	48 (64.9%)	26 (35.1%)	161 (50.5%)	158 (49.5%)	135 (57.0%)	102 (43.0%)
Image sharing (e.g., Flickr, Instagram, Pinterest)	11 (14.9%)	63 (85.1%)	43 (13.5%)	276 (86.5%)	66 (27.8%)	171 (72.2%)
Social bookmarking (e.g., Delicious)	1 (1.4%)	73 (98.6%)	5 (1.6%)	314 (98.4%)	9 (3.8%)	228 (96.2%)
Social networking (e.g., Facebook, Google+)	42 (56.8%)	32 (43.2%)	155 (48.6%)	164 (51.4%)	133 (56.1%)	104 (43.9%)
Social news sites (e.g., Reddit)	5 (6.8%)	69 (93.2%)	32 (10.0%)	287 (90.0%)	30 (12.7%)	207 (87.3%)

Table A1.8 Continued

Specific Social Media Use Related to Discipline

Variables Examined: (Q13) Social Media Use	Discipline <i>n</i> (percent)					
	Health Sciences		Natural Sciences & Engineering		Humanities & Social Sciences	
	Yes	No	Yes	No	Yes	No
VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)	21 (28.4%)	53 (71.6%)	84 (26.3%)	235 (73.7%)	63 (26.6%)	174 (73.4%)
Do-it-yourself networks (e.g., Ning)	0 (0.0%)	74 (100.0%)	6 (1.9%)	313 (98.1%)	6 (2.5%)	231 (97.5%)
File sharing (e.g., Dropbox, Google Drive, BitTorrent)	42 (56.8%)	32 (43.2%)	147 (46.1%)	172 (53.9%)	115 (48.5%)	122 (51.5%)
Video sharing (e.g., YouTube, Vine)	43 (58.1%)	31 (41.9%)	132 (41.4%)	187 (58.6%)	110 (46.4%)	127 (53.6%)
Location-based applications (e.g., Foursquare, Google Maps)	11 (14.9%)	63 (85.1%)	36 (11.3%)	283 (88.7%)	40 (16.9%)	197 (83.1%)
Microblogs (e.g., Twitter)	6 (8.1%)	68 (91.9%)	37 (11.6%)	282 (88.4%)	54 (22.8%)	183 (77.2%)

Table A1.9

Ways of Making Meaning Related to Year of Study

Variables Examined: (Q10) Ways of Making Meaning	Year of Study							
	<i>n</i> (percent)							
	1 st Year		2 nd Year		3 rd Year		4 th Year	
	Yes	No	Yes	No	Yes	No	Yes	No
Gaining your own deep understanding (e.g., of a concept).	101 (74.8%)	34 (25.2%)	98 (76.6%)	30 (23.4%)	123 (77.8%)	35 (22.2%)	138 (76.2%)	43 (23.8%)
Saying something in your own words.	71 (52.6%)	64 (47.4%)	76 (59.4%)	52 (40.6%)	80 (50.6%)	78 (49.4%)	104 (57.5%)	77 (42.5%)
Interacting with different perspectives.	59 (43.7%)	76 (56.3%)	59 (46.1%)	69 (53.9%)	73 (46.2%)	85 (53.8%)	104 (57.5%)	77 (42.5%)
Discussing with other people.	69 (51.1%)	66 (48.9%)	72 (56.3%)	56 (43.8%)	89 (56.3%)	69 (43.7%)	108 (59.7%)	73 (40.3%)
Applying your experience to real life (e.g., your career).	82 (60.7%)	53 (39.3%)	81 (63.3%)	47 (36.7%)	99 (62.7%)	59 (37.3%)	132 (72.9%)	49 (27.1%)
Putting your learning into context.	70 (51.9%)	65 (48.1%)	81 (63.3%)	47 (36.7%)	81 (51.3%)	77 (48.7%)	121 (66.9%)	60 (33.1%)
Researching information.	58 (43.0%)	77 (57.0%)	59 (46.1%)	69 (53.9%)	74 (46.8%)	84 (53.2%)	102 (56.4%)	79 (43.6%)
Seeking help from others.	58 (43.0%)	77 (57.0%)	58 (45.3%)	70 (54.7%)	61 (38.6%)	97 (61.4%)	61 (33.7%)	120 (66.3%)
Working through the process of figuring something out (e.g., solving a problem).	83 (61.5%)	52 (38.5%)	93 (72.7%)	35 (27.3%)	102 (64.6%)	56 (35.4%)	112 (61.9%)	69 (38.1%)

Table A1.10

Specific Social Media Use Related to Year of Study

Variables Examined: (Q13) Social Media Use	Year of Study							
	<i>n</i> (percent)							
	1 st Year		2 nd Year		3 rd Year		4 th Year	
	Yes	No	Yes	No	Yes	No	Yes	No
Blogs (e.g., Blogger, WordPress)	22 (16.3%)	113 (83.7%)	22 (17.2%)	106 (82.8%)	26 (16.5%)	132 (83.5%)	41 (22.7%)	140 (77.3%)
Wikis (e.g., Wikimedia)	65 (48.1%)	70 (51.9%)	62 (48.4%)	66 (51.6%)	56 (35.4%)	102 (64.6%)	71 (39.2%)	110 (60.8%)
Google Apps (e.g., Google Calendar, Google Docs)	74 (54.8%)	61 (45.2%)	72 (56.3%)	56 (43.8%)	85 (53.8%)	73 (46.2%)	91 (50.3%)	90 (49.7%)
Image sharing (e.g., Flickr, Instagram, Pinterest)	39 (28.9%)	96 (71.1%)	16 (12.5%)	112 (87.5%)	28 (17.7%)	130 (82.3%)	32 (17.7%)	149 (82.3%)
Social bookmarking (e.g., Delicious)	5 (3.7%)	130 (96.3%)	2 (1.6%)	126 (98.4%)	3 (1.9%)	155 (98.1%)	3 (1.7%)	178 (98.3%)
Social networking (e.g., Facebook, Google+)	79 (58.5%)	56 (41.5%)	71 (55.5%)	57 (44.5%)	74 (46.8%)	84 (53.2%)	87 (48.1%)	94 (51.9%)
Social news sites (e.g., Reddit)	19 (14.1%)	116 (85.9%)	11 (8.6%)	117 (91.4%)	13 (8.2%)	145 (91.8%)	19 (10.5%)	162 (89.5%)

Table A1.10 Continued

Specific Social Media Use Related to Year of Study

Variables Examined: (Q13) Social Media Use	Year of Study							
	<i>n</i> (percent)							
	1 st Year		2 nd Year		3 rd Year		4 th Year	
	Yes	No	Yes	No	Yes	No	Yes	No
VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)	39 (28.9%)	96 (71.1%)	38 (29.7%)	90 (70.3%)	32 (20.3%)	126 (79.7%)	48 (26.5%)	133 (73.5%)
Do-it-yourself networks (e.g., Ning)	5 (3.7%)	130 (96.3%)	2 (1.6%)	126 (98.4%)	2 (1.3%)	156 (98.7%)	2 (1.1%)	179 (98.9%)
File sharing (e.g., Dropbox, Google Drive, BitTorrent)	48 (35.6%)	87 (64.4%)	66 (51.6%)	62 (48.4%)	78 (49.4%)	80 (50.6%)	90 (49.7%)	91 (50.3%)
Video sharing (e.g., YouTube, Vine)	70 (51.9%)	65 (48.1%)	55 (43.0%)	73 (57.0%)	73 (46.2%)	85 (53.8%)	75 (41.4%)	106 (58.6%)
Location-based applications (e.g., Foursquare, Google Maps)	20 (14.8%)	115 (85.2%)	18 (14.1%)	110 (85.9%)	21 (13.3%)	137 (86.7%)	19 (10.5%)	162 (89.5%)
Microblogs (e.g., Twitter)	23 (17.0%)	112 (83.0%)	15 (11.7%)	113 (88.3%)	23 (14.6%)	135 (85.4%)	30 (16.6%)	151 (83.4%)

Table A1.11

Specific Social Media Use Related to Making Meaning Individually Versus Socially

Variables Examined: Social Media Use	Individual vs. Social Meaning Making in Learning					
	<i>n</i> (percent)					
	Individually (Personally)		With Others (Socially)		Both Individually (Personally) and With Others (Socially)	
	Yes	No	Yes	No	Yes	No
Blogs (e.g., Blogger, WordPress)	47 (16.0%)	246 (84.0%)	7 (21.2%)	26 (78.8%)	66 (21.6%)	240 (78.4%)
Wikis (e.g., Wikimedia)	112 (38.2%)	181 (61.8%)	18 (54.5%)	15 (45.5%)	144 (47.1%)	162 (52.9%)
Google Apps (e.g., Google Calendar, Google Docs)	132 (45.1%)	161 (54.9%)	20 (60.6%)	13 (39.4%)	198 (64.7%)	108 (35.3%)
Image sharing (e.g., Flickr, Instagram, Pinterest)	38 (13.0%)	255 (87.0%)	5 (15.2%)	28 (84.8%)	77 (25.2%)	229 (74.8%)
Social bookmarking (e.g., Delicious)	4 (1.4%)	289 (98.6%)	1 (3.0%)	32 (97.0%)	10 (3.3%)	296 (96.7%)
Social networking (e.g., Facebook, Google+)	124 (42.3%)	169 (57.7%)	19 (57.6%)	14 (42.4%)	193 (63.1%)	113 (36.9%)
Social news sites (e.g., Reddit)	20 (6.8%)	273 (93.2%)	3 (9.1%)	30 (90.9%)	45 (14.7%)	261 (85.3%)

Table A1.11 Continued

Specific Social Media Use Related to Making Meaning Individually Versus Socially

Variables Examined: Social Media Use	Individual vs. Social Meaning Making in Learning <i>n</i> (percent)					
	Individually (Personally)		With Others (Socially)		Both Individually (Personally) and With Others (Socially)	
	Yes	No	Yes	No	Yes	No
VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)	55 (18.8%)	238 (81.2%)	11 (33.3%)	22 (66.7%)	105 (34.3%)	201 (65.7%)
Do-it-yourself networks (e.g., Ning)	3 (1.0%)	290 (99.0%)	1 (3.0%)	32 (97.0%)	9 (2.9%)	297 (97.1%)
File sharing (e.g., Dropbox, Google Drive, BitTorrent)	116 (39.6%)	177 (60.4%)	21 (63.6%)	12 (36.4%)	170 (55.6%)	136 (44.4%)
Video sharing (e.g., YouTube, Vine)	111 (37.9%)	182 (62.1%)	16 (48.5%)	17 (51.5%)	166 (54.2%)	140 (45.8%)
Location-based applications (e.g., Foursquare, Google Maps)	20 (6.8%)	273 (93.2%)	4 (12.1%)	29 (87.9%)	64 (20.9%)	242 (79.1%)
Microblogs (e.g., Twitter)	29 (9.9%)	264 (90.1%)	9 (27.3%)	24 (72.7%)	59 (19.3%)	247 (80.7%)

Table A1.12

Ways of Making Meaning Making in University Learning Related to Age

Variables Examined		Age <i>n</i> (<i>M</i> , <i>SD</i>)
(Q10) Ways of Making Meaning		
Gaining your own deep understanding (e.g., of a concept).	Yes	499 (22.29, 4.71)
	No	148 (22.48, 5.00)
Saying something in your own words.	Yes	353 (22.37, 4.49)
	No	294 (22.30, 5.10)
Interacting with different perspectives.	Yes	322 (22.78, 5.09)
	No	325 (21.90, 4.41)
Discussing with other people.	Yes	366 (22.42, 4.73)
	No	281 (22.23, 4.84)
Applying your experience to real life (e.g., your career).	Yes	428 (22.61, 4.92)
	No	219 (21.81, 4.44)
Putting your learning into context.	Yes	380 (22.55, 5.07)
	No	267 (22.03, 4.31)
Researching information.	Yes	319 (22.98, 5.42)
	No	328 (21.71, 3.95)
Seeking help from others.	Yes	255 (22.04, 4.55)
	No	392 (22.53, 4.91)
Working through the process of figuring something out (e.g., solving a problem).	Yes	424 (22.28, 4.76)
	No	223 (22.44, 4.82)

Table A1.13

Social Media Use in University Learning Related to Age

Variables Examined		Age <i>n (M, SD)</i>
(Q13) Specific social media use		
Blogs (e.g., Blogger, WordPress)	Yes	119 (23.0, 6.06)
	No	528 (22.2, 4.43)
Wikis (e.g., Wikimedia)	Yes	273 (22.0, 4.62)
	No	374 (22.6, 4.87)
Google Apps (e.g., Google Calendar, Google Docs)	Yes	348 (22.2, 4.32)
	No	299 (22.5, 5.26)
Image sharing (e.g., Flickr, Instagram, Pinterest)	Yes	119 (21.9, 4.69)
	No	528 (22.4, 4.79)
Social bookmarking (e.g., Delicious)	Yes	14 (23.3, 4.84)
	No	633 (22.3, 4.77)
Social networking (e.g., Facebook, Google+)	Yes	333 (22.3, 4.78)
	No	314 (22.4, 4.78)
Social news sites (e.g., Reddit)	Yes	67 (22.1, 5.03)
	No	580 (22.4, 4.74)
VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)	Yes	170 (22.3, 4.82)
	No	477 (22.4, 4.76)
Do-it-yourself networks (e.g., Ning)	Yes	12 (22.8, 6.06)
	No	635 (22.3, 4.75)
File sharing (e.g., Dropbox, Google Drive, BitTorrent)	Yes	306 (22.2, 3.57)
	No	341 (22.5, 5.64)
Video sharing (e.g., YouTube, Vine)	Yes	291 (22.3, 4.66)
	No	356 (22.4, 4.86)
Location-based applications (e.g., Foursquare, Google Maps)	Yes	87 (23.3, 5.68)
	No	560 (22.2, 4.60)
Microblogs (e.g., Twitter)	Yes	96 (22.4, 5.31)
	No	551 (22.3, 4.68)

Table A1.14

Correlations for Age and (Q14) Importance of Social Media in Learning

		Blogs	Wikis	Google Apps	Image sharing	Social bookmarking	Social networking	Social news sites	VOIP and Instant messaging
Age	Pearson Correlation	-0.081	0.075	0.011	-0.011	-0.008	-0.071	0.001	-0.018
	Sig. (2-tailed)	0.096	0.124	0.818	0.813	0.870	0.143	0.990	0.712
	<i>n</i>	424	424	431	426	421	429	420	424

Table A1.14 Continued

Correlations for Age and (Q14) Importance of Social Media in Learning

		Do-it-yourself networks	File sharing	Video sharing	Location-based applications	Microblogs
Age	Pearson Correlation	-0.026	0.004	-0.024	-0.067	-0.054
	Sig. (2-tailed)	0.598	0.928	0.623	0.174	0.273
	<i>n</i>	414	426	428	418	417

Table A1.15

Correlations for Age and (Q15) Usefulness of Social Media Characteristics

		Building relationships with peers	Building relationships with instructors	Creating media to share online	Sharing information online	Posting/ Re-posting media or information found online	Commenting on media or information found online	Collaborating to create documents online	Tracking and managing your academic schedule
Age	Pearson Correlation	0.029	0.036	0.026	-0.002	-0.075	-0.090	0.098	0.023
	Sig. (2-tailed)	0.553	0.456	0.599	0.967	0.128	0.067	0.046*	0.642
	<i>n</i>	423	422	421	418	417	417	419	420

*significant at 0.05.

Note: According to Colton’s (1974) criteria (described above), even though there is statistical significance for the value 0.098, this is not a strong correlation.

Table A1.16

Correlations for Age and (Q16) Making Meaning via Social Media Characteristics

		Building relationships with peers	Building relationships with instructors	Creating media to share online	Sharing information online	Posting/ Re-posting media or information found online	Commenting on media or information found online	Collaborating to create documents online	Tracking and managing your academic schedule
Age	Pearson Correlation	0.013	0.045	0.014	-0.063	-0.083	-0.057	0.057	0.005
	Sig. (2-tailed)	0.796	0.361	0.777	0.202	0.089	0.247	0.242	0.920
	<i>n</i>	420	418	417	418	418	417	419	418

Appendix B:
Survey Instrument

Q1. Consent

- I agree
- I do not agree (*branching – ends survey*)

Q2. Are you an undergraduate student?

- Yes
- No (*branching – ends survey*)

Q3. Are you enrolled as a full-time student at the University of Alberta?

- Yes
- No

Q4. What Faculty are you enrolled in?

- | | |
|---|--|
| <input type="radio"/> Agricultural, Life and Environmental Sciences | <input type="radio"/> Native Studies |
| <input type="radio"/> Alberta School of Business | <input type="radio"/> Nursing |
| <input type="radio"/> Arts | <input type="radio"/> Pharmacy and Pharmaceutical Sciences |
| <input type="radio"/> Education | <input type="radio"/> Physical Education and Recreation |
| <input type="radio"/> Engineering | <input type="radio"/> Rehabilitation Medicine |
| <input type="radio"/> Law | <input type="radio"/> Science |
| <input type="radio"/> Medicine & Dentistry | <input type="radio"/> School of Public Health |

Other (please specify)

Q5. What program (e.g., department) are you enrolled in?

Q6. What year of study are you in?

- (1) First Year
- (2) Second Year
- (3) Third Year
- (4) Fourth Year

Other (please specify)

Q7. What is your year of birth?

- 1989
- 1990
- 1991
- 1992
- 1993
- 1994
- 1995
- 1996

Other (please specify)

Q8. Do you identify yourself as:

- Male
- Female

Other (please specify)

Q9. Are you an international student?

- Yes
- No

Q10. How do you make meaning ("make sense") of your university learning?

Please check all that apply:

- a) gaining your own deep understanding (e.g., of a concept)
- b) saying something in your own words
- c) interacting with different perspectives
- d) discussing with other people
- e) applying your experience to real life (e.g., your career)
- f) putting your learning into context
- g) researching information
- h) seeking help from others
- i) working through the process of figuring something out (e.g., solving a problem)

Other (please specify)

Q11. How do you most often make meaning ("make sense") of your university learning?

- individually (personally)
 with others (socially)
 both individually (personally) and with others (socially)

Perceptions of Social Media

Social media include applications and websites that allow users to create and share content. Social media also enable users to connect via web technologies or to participate in social networks.

Q12. Do you use social media in your own university learning?

- Yes (*branching – goes to question 13*)
 No (*branching – goes to question 18*)

Q13. In your own university learning, do you use any of the following? Please check all that apply:

- a) Blogs (e.g., Blogger, WordPress)
b) Wikis (e.g., Wikimedia)
c) Google Apps (e.g., Google Calendar, Google Docs)
d) Image sharing (e.g., Flickr, Instagram, Pinterest)
e) Social bookmarking (e.g., Delicious)
f) Social networking (e.g., Facebook, Google+)
g) Social news sites (e.g., reddit)
h) VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)
i) Do-it-yourself networks (e.g., Ning)
j) File sharing (e.g., Dropbox, Google drive, BitTorrent)
k) Video sharing (e.g., YouTube, Vine)
l) Location-based applications (e.g., Foursquare, Google Maps)
m) Image sharing (e.g., Flickr, Instagram, Pinterest)

Other (please specify)

Q14. In your opinion, do you see these social media as an important part of your university learning?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) Blogs (e.g., Blogger, WordPress)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Wikis (e.g., Wikimedia)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Google Apps (e.g., Google Calendar, Google Docs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Image sharing (e.g., Flickr, Instagram, Pinterest)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Social bookmarking (e.g., Delicious)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Social networking (e.g., Facebook, Google+)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Social news sites (e.g., reddit)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) VOIP and Instant messaging (e.g., Skype, Google Talk/Chat, WhatsApp)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Do-it-yourself networks (e.g., Ning)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) File sharing (e.g., Dropbox, Google Drive, BitTorrent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Video sharing (e.g., YouTube, Vine)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Location-based applications (e.g., Foursquare, Google Maps)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Microblogs (e.g., Twitter)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

Q15. In your opinion, are the following characteristics of social media useful for your university learning?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) Building relationships with peers (e.g., Facebook, LinkedIn)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Building relationships with instructors (e.g., Facebook, LinkedIn)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Creating media to share online (e.g., pictures, videos, music)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Sharing information online (e.g., links to websites, articles)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Posting/Re-posting media or information found online (e.g., re-tweeting, sharing links)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Commenting on media or information found online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Collaborating to create documents online (e.g., Google docs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Tracking and managing your academic schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

Q16. In your opinion, do the following characteristics of social media help you to make meaning (make sense) of your university learning?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
a) Building relationships with peers (e.g., Facebook, LinkedIn)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Building relationships with instructors (e.g., Facebook, LinkedIn)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Creating media to share online (e.g., pictures, videos, music)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Sharing information online (e.g., links to websites, articles)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Posting/Re-posting media or information found online (e.g., re-tweeting, sharing links)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Commenting on media or information found online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Collaborating to create documents online (e.g., Google docs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Tracking and managing your academic schedule	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

Q17. Please take a moment to tell us why you use social media in your university learning.

Q18. Please take a moment to tell us why you do not use social media in your university learning.

Thank you for completing this survey!

You can choose to be entered in a draw to win a \$25 iTunes gift cards by following this link to a Google form that is separate from SurveyMonkey: [Click here to enter your name into the iTunes gift card draw](#)

Q19. Other comments or questions about this study? Please list them here:

Appendix C:

Qualitative Participant Characteristics

Table C1.1

Qualitative Sample: 30 Undergraduate Participants' Characteristics

Pseudonym	Sex	Undergraduate Year	Birth Year	Cohort Program	Faculty	Disciplinary Category
Anne	Female	1	1995	No	Arts	Humanities & Social Sciences
Joseph	Male	3	1993	Yes	Arts	Humanities & Social Sciences
Sarah	Female	3	1993	No	Arts	Humanities & Social Sciences
Erin	Female	2	1994	No	Arts	Humanities & Social Sciences
Amanda	Female	1	1992	No	Arts	Humanities & Social Sciences
Hillary	Female	2	1994	No	Arts	Humanities & Social Sciences
Greg	Male	4	1990	No	Arts	Humanities & Social Sciences
Geoffrey	Male	3	1991	No	Arts	Humanities & Social Sciences
Sonya	Female	1	1994	No	Native Studies	Humanities & Social Sciences
Ian	Male	2	1994	No	Physical Education	Humanities & Social Sciences
Thomas	Male	1	1995	No	Science	Natural Sciences & Engineering
Jennifer	Female	1	1995	No	Science	Natural Sciences & Engineering
Richard	Male	1	1995	No	Science	Natural Sciences & Engineering
Brad	Male	1	1995	No	Science	Natural Sciences & Engineering
Jane	Female	2	1994	No	Science	Natural Sciences & Engineering
Dorothy	Female	1	1995	No	Science	Natural Sciences & Engineering

Table C1.1 Continued

Qualitative Sample: 30 Undergraduate Participants' Characteristics

Pseudonym	Sex	Undergraduate Year	Birth Year	Cohort Program	Faculty	Disciplinary Category
Katie	Female	1	1996	No	Agricultural, Life & Environmental Sciences	Natural Sciences & Engineering
David	Male	3	1993	No	Engineering	Natural Sciences & Engineering
Kyle	Male	2	1993	No	Engineering	Natural Sciences & Engineering
George	Male	2	1992	No	Science	Natural Sciences & Engineering
Jessica	Female	1	1995	Yes	Nursing	Health Sciences
Justin	Male	3	1993	Yes	Medicine & Dentistry	Health Sciences
Mike	Male	4	1991	No	Physical Education	Health Sciences
Kim	Female	3	1993	Yes	Medicine & Dentistry	Health Sciences
Danielle	Female	2	1992	Yes	Pharmacy & Pharmaceutical Sciences	Health Sciences
Caroline	Female	4	1992	Yes	Pharmacy & Pharmaceutical Sciences	Health Sciences
Mina	Female	1	1994	Yes	Nursing	Health Sciences
Deborah	Female	1	1988	Yes	Medicine & Dentistry	Health Sciences
Alice	Female	3	1993	Yes	Nursing	Health Sciences
Mary	Female	3	1990	Yes	Nursing	Health Sciences

Appendix D:

Interview Guide

The following is a guide for semi-structured interviews, tested in a pilot interview.

Introductory Demographic Questions

1. Background Information

Are you a full-time undergraduate student? Yes No

What Faculty are you enrolled in? _____

What Department are you enrolled in? _____

What year of undergraduate study are you in? 1 2 3 4

Please provide the following information:

Year of birth: _____

Sex: (please circle) Male Female

Are you an international or local student? (please circle) International Local

INTERVIEW GUIDE

The following shows the format guiding the semi-structured interview questions as a part of Phase One (*interviewer notes are in italics*).

Guide for Semi-Structured Interviews

1. In the context of your university learning, what do the words “social media” mean to you? (*probing question may include – can you provide me with an example? What aspects or characteristics do you associate with these words?*)
2. In the context of your university learning, what do the words “meaning making” (or, “making meaning/sense”) mean to you? (*probing question may include – can you provide me with an example? What aspects or characteristics do you associate with these words?*)
3. Can you think of a recent situation where you used social media as a part of your university studies? Please describe (probing questions):

- What happened? *(ask participant to describe in detail the situation, including learning situation/issue and technolog(ies) used)*
 - What learning issue were you trying to make meaning of when you were using this technology (or technologies)?
 - Why did you use this technology (or technologies)?
 - What were you trying to make meaning of, or learn about?
 - Did you have a discussion or exchange with others (e.g., ask for examples either through verbal description or have participants show a situation online)
 - Who did you discuss or interact with online (e.g., students, professors, experts)?
 - Did you negotiate any misunderstanding or differences of opinion/perspective?
 - Does this connect with your past learning experiences?
 - What conclusions did you come to, or what was the result?
 - Do you believe that the use of technology in this situation helped or hindered you in making sense of your learning? Why do you believe this is the case? *(probing questions may include – How did it help? How did it hinder? What did it allow you to achieve/do?)*
 - Would you use this social media as a part of your learning in the future? *(probing questions may include – if so, where/when do you plan to use it/them, and why?)*
4. Social media are often thought of as including social networking and web technologies, such as Facebook and Twitter. They can also include content sharing and collaboration tools (such as Google Apps or Facebook). *(Can supply a more detailed list of these technologies in person during the interview, as an aid).*
- In your university studies, do you use any of these social media technologies as a part of your learning? If so, what technologies do you use, and why do you use them?
 - Do you believe that your use of these emerging technologies is successful in supporting your learning in a meaningful way? *(probing questions may include -- If so, why? If not, why not? Were you asked to use them as a part of your class, or did you choose to use them on your own? What aspects or characteristics did you find valuable? What was enhanced or added valued? What discussions, exchanges or interactions occurred, and with whom?)*
 - In your university studies, are there any social media technology that you do *not* use as a part of your learning? If so, what technologies do you not use, and why do you choose not to use them?
 - Do you believe that your use of these social media your learning in some way? *(probing questions may include -- If so, why? If not, why not? What aspects or characteristics did you find detrimental? Does this change depending on the person or context (e.g., students or profs)? What was missing, or could be found elsewhere?)*
5. Is there anything else you'd like to tell me about social media in your university studies?